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Impacts of the 2024-2030 Free Allocation Rules on the Economy and Greenhouse Gas Emissions Reduction

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Impacts of the 2024-2030 Free Allocation Rules on the Economy and Greenhouse Gas Emissions Reduction

June 2022



The Ministère des Finances and the Ministère de l'Environnement et de la Lutte contre les changements climatiques produced this publication.

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IMPACTS OF THE 2024-2030 FREE ALLOCATION RULES ON THE ECONOMY AND GREENHOUSE GAS EMISSIONS REDUCTION

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HIGHLIGHTS

Québec has set a target of reducing greenhouse gas (GHG) emissions by 37.5% in 2030 compared to 1990 levels. It also intends to make a longer-term commitment to achieve carbon neutrality (zero net emissions) in 2050.

Among the means used to reach its climate objectives, Québec has favoured a cap-and-trade system for greenhouse gas emission allowances (CAT system).

- This system came into effect in 2013. It mainly targets fuel distributors as well as large industrial businesses.¹
- This economic tool is based on the idea of a market where allowances to emit GHGs are traded. The number of allowances is controlled by government authorities and the system limits the quantity of emissions allowed (emission caps).

Like other CAT systems in the world, Québec's CAT system provides free emission allowances to large industrial businesses exposed to international trade. This mitigates the effect of carbon pricing on their competitiveness and limits the relocation of industrial activities, which can lead to an increase in GHG emissions on a global scale.

The *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances* establishes the rules governing the calculation of the free allocation until 2023.

A draft regulatory amendment determining the rules for the period 2024-2030 is to be published in the *Gazette officielle du Québec* for public consultation.

 One of the central points of this approach concerns the expected reduction in the free allocation of emission units to large industrial businesses and the consignment, on behalf of these businesses, of a portion of the reduced units to finance their climate transition.

□ An approach consistent with Québec's climate objectives

Too little free allocation may harm the competitiveness of some industrial businesses, as global carbon pricing practices are not equally stringent. This situation may encourage these businesses to move part of their production to regions where carbon pricing is lower or even non-existent (carbon leakage).

 This can lead to an increase in global GHG emissions if production is relocated to countries with more emissive manufacturing processes.

By limiting the relocation of activities, free allocation can contribute to global climate change goals. However, in the long run, the total quantity of emission units granted free of charge must remain consistent with the decrease in the system's emission caps.

 If free allocation was maintained at too high a level, all GHG emission units could end up being distributed free of charge to the industrial sector.

A gradual reduction in the free allocation granted to businesses is therefore necessary to ensure consistency with Québec's climate objectives and to preserve the integrity of the CAT system.

Specifically, businesses subject to the CAT system are distributors of 200 litres or more of fuels per year, large industrial emitters emitting 25 000 tonnes of CO₂ equivalent and more per year as well as electricity producers and importers. Industrial businesses reporting at least 10 000 tonnes of CO₂ equivalent and less than 25 000 tonnes of CO₂ equivalent may voluntarily join the system. The term "large industrial businesses" is used to refer to industrial establishments that are subject to the CAT system.

□ A balanced approach to fighting climate change

The new free allocation rules aim to:

- ensure a decrease in the level of free allocation consistent with Québec's climate objectives, including the target of reducing GHG emissions to 37.5% below 1990 levels by 2030;
- maintain the competitiveness of the industrial sector, given Québec's lead in carbon pricing compared to its main competitors;
- accelerate business investment in their climate transition;
- adapting the free allocation to take into account changes in the reality of businesses since the implementation of the CAT system.

New free allocation rules 2024-2030

Overall, the proposed approach for the 2024-2030 period provides for:²

- a gradual decrease in the overall level of free allocation granted, consistent with the decrease in emission caps and the 2030 reduction target;
- a modulation of the rate of reduction of the free allocation according to the risk of relocation of establishments;
- the consideration of more recent GHG emissions intensity performance of businesses in order to adapt to new business realities;
- the consignment, on behalf of businesses, of a portion of the emission units resulting from the reduction in the level of free allocation.
 - Revenues from the auctioning of the consigned units will be set aside on behalf of each business to finance projects related to the climate transition.

As such, the new free allocation rules will make it possible to grant free emission units to industrial businesses in the two following ways:

- free allocation granted, which may be used by businesses to ensure their current or future compliance;
- consigned free allocation, which may be used to finance projects to reduce GHG emissions.

• A 2.7% average annual reduction in free allocation

The new proposed approach for the period 2024-2030 provides for a reduction in free allocation per unit produced for each establishment.

This reduction is expected to average 2.7% per year over this period for all large industrial businesses.

² Work on the free allocation for 2024-2030 is the result of a collaboration between several government departments and one organization of the Québec government, namely the Ministère de l'Environnement et de la Lutte contre les changements climatiques, the Ministère de l'Économie et de l'Innovation, the Ministère des Finances, the Ministère des Forêts, de la Faune et des Parcs, the Ministère de l'Énergie et des Ressources naturelles and the Société du Plan Nord.

□ A coherent approach that helps maintain the competitiveness of the industrial sector

With the new rules, it is estimated that the total volume of free allocation granted to large industrial businesses will decrease from 2024 onwards despite the expected increase in production.

Based on projected economic growth, the level of free allocation granted to businesses could decrease by 2.9 million tonnes of CO₂ equivalent (Mt CO₂ eq.)³ between 2023 and 2030.

- However, if free allocation units consigned on behalf of businesses were taken into account, the decrease would be smaller.
- For comparison, maintaining the allocation per unit produced at the prescribed level for 2023 would result in an increase in free allocation of 0.9 million tonnes of CO₂ equivalent between 2023 and 2030.

Under the proposed rules, the total volume of free allocation should therefore reflect a trajectory consistent with Québec's climate objectives.

It is estimated that the average proportion of free allocation granted to businesses per unit produced will decrease from 91% in 2023 to 75% in 2030 compared to their baseline intensity.

— However, if consigned units were taken into account, this proportion should be 85% in 2030.

CHART 1

CHART 2

Total volume of free allocation

Average proportion of free allocation per unit produced



changements climatiques and Ministère des Finances du Québec.

3 In this document, emissions in CO₂ equivalent are expressed in metric tonnes.

du Québec.

□ New rules: a potential financial impact of \$671 M over the period 2024-2030

Over the entire 2024-2030 period, it is estimated that the free allocation rules could result in an additional financial impact (purchase of additional allowances) of \$671 million^{4, 5} for all industrial businesses currently subject to the CAT system, compared to a situation where free allocation per unit produced is maintained at the prescribed level for 2023.

- Moreover, it is estimated that \$581 million would be set aside for businesses in order to finance their GHG emission reduction projects.
- These amounts will come from the auction of consigned emission units, which represent a share of the emission units resulting from the total reduction in the free allocation level.⁶

Overall, if the financial impact of maintaining the prescribed rules for 2023 until 2030 were also taken into consideration, the total cumulative financial impact of the free allocation rules would represent \$1.2 billion for the businesses that will be required to purchase allowances.

 This would correspond to an average cost of approximately \$9 per tonne of CO₂ equivalent emitted from 2024 to 2030 for large industrial businesses.

TABLE 1

Total financial impact of the CAT system for large industrial businesses from 2024 to 2030 (millions of dollars, unless otherwise indicated)

	Financial impact of maintaining the rules ⁽¹⁾	Financial impact of the new rules	Total financial impact	Average cost per tonne of CO ₂ equivalent of emissions (dollars)
Pulp and paper ⁽²⁾	141	48	190	20
Chemicals and refineries	117	190	306	11
Mining, pelletizing and metallurgy	94	151	245	9
Aluminum	34	163	197	5
Cement and lime	52	105	157	6
Other ⁽³⁾	62	15	76	19
TOTAL	500	671	1 171	9

Note: Estimates without improvement in the performance of businesses in terms of GHG emissions and with constant production.

(1) Based on the assumption that the free allocation rules prescribed for 2023 are maintained for the period 2024-2030.

(2) Financial impact includes costs associated with covering emissions from cogeneration, an activity not eligible for free allocation.

(3) The majority of emissions from "Other" establishments are combustion emissions, for which the level of free allocation is lower than for fixed process emissions.

⁴ Estimates are based on information available as of January 31, 2022.

⁵ The financial impact is obtained by comparing the value of total emission allowance purchases with that of the purchases that would be made if the prescribed free allocation rules for 2023 were maintained until 2030. Business production and GHG emissions performance are assumed to be constant through 2030. The key assumptions used to conduct the impact analyses are presented in Section 3.

⁶ The value of the total reduction in free allocation granted (reduction of excess allowances and additional purchases of emission allowances) is estimated at \$963 million over the period 2024-2030.

□ A limited impact of \$57 M on Québec's real GDP in 2030

The new free allocation rules are part of a balanced approach to fighting climate change.

- First, the reduction in free allocation will lead to an increase in the cost for some businesses, who will need to reduce their GHG emissions or purchase additional emission allowances in order to cover their emissions.
- On the other hand, the new rules will also result in additional revenues, which will be reinvested in the implementation plan of the 2030 Plan for a Green Economy, in particular with respect to consignment.

As such, it is estimated that the new free allocation rules will have a small negative impact of \$57 million on Québec's real GDP in 2030 (less than 0.1%) compared with a situation where free allocation per unit produced is maintained at the prescribed level for 2023. The impact on the economy would result from:

- an increase in business investment (+\$72 million), associated with the implementation of GHG emission reduction projects;
- a decrease in net exports (-\$129 million), due in particular to an increase in imports, which have a downward effect on GDP.

However, additional measures to fight climate change outside Québec could limit the negative effects of the new rules on the Québec economy.

Moreover, the first implementation plan of the 2030 Plan for a Green Economy, which will be revised on an annual basis, provided for \$768 million by 2026 to support the industrial sector through different GHG emission reduction measures and the emergence of new technologies. The positive effect of these measures on the economy is not included in the estimates.

TABLE 2

Economic impact of the new free allocation rules in 2030 (millions of dollars, in real terms)

	Free allocation rules 2024-2030
Consumption	_
Investment	72
Net exports	-129
Government spending	_
TOTAL – GDP	-57
Household disposable income	-5
Jobs (number)	-430

Note: The impact analyses take into account the effects of the CAT system and the reinvestment of revenues from the CAT system in the implementation plan of the 2030 Plan for a Green Economy. They do not take into account the implementation of additional actions to fight climate change in Québec and in the rest of the world. These estimates are based on information available in January 2022 and on the GHG emission projections made in the 2020-2021 budget.

Different economic impacts in different sectors of the economy

It is estimated that the new free allocation rules will have a negative impact of \$57 million on Québec's real GDP in 2030. However, the effect will differ between the various sectors of the economy.

The industrial sectors most affected would be:

- the petroleum and coal product manufacturing sector (-0.3% of the sector's GDP), which includes refineries;
- the primary and fabricated metal products manufacturing sector (-0.2%), which includes, in particular, the aluminum sector;
- the non-metallic mineral product manufacturing sector (-0.2%), mainly represented by cement plants;
- the paper manufacturing and printing sector (-0.1%), which mainly includes the pulp and paper sector.

□ An effect of 0.7 Mt CO₂ eq. on GHG emissions reduction in 2030

Based on the simulations, it is estimated that the new free allocation rules will result in a reduction in Québec GHG emissions in 2030 of 0.7 million tonnes of CO_2 equivalent (the equivalent of 0.8% of total emissions in Québec in 2019) compared with a situation where free allocation per unit produced is maintained at the prescribed level for 2023.

These reductions are due to:

- the decrease in the level of free allocation (-0.4 million tonnes of CO₂ equivalent);
- the projects funded by amounts generated by consigned units or by amounts deposited into the Electrification and Climate Change Fund (ECCF), which will be used to finance measures under the 2030 Plan for a Green Economy across the economy (-0.3 million tonnes of CO₂ equivalent).

These reductions are in addition to those already planned under the 2030 Plan for a Green Economy.

TABLE 3

Impact of the new free allocation rules on GHG emissions

(million tonnes of CO₂ equivalent)

	Free allocation rules 2024-2030
Decrease in the level of free allocation	-0.4
Consignment and reinvestment of amounts	-0.3
TOTAL	-0.7

Note: The impact analyses take into account the effects of the CAT system and the reinvestment of revenues from the CAT system in the implementation plan of the 2030 Plan for a Green Economy. The estimates are made all other things being equal, without considering the implementation of additional actions to fight climate change in Québec and in the rest of the world. These estimates are based on information available in January 2022 and on the GHG emission projections made in the 2020-2021 budget.

1. CONTEXT OF THE CAP-AND-TRADE SYSTEM

Since 2013, Québec has priced its greenhouse gas (GHG) emissions by means of a cap-and-trade system for greenhouse gas emission allowances (CAT system).

- Under this system, reporting establishments⁷ must obtain an emission allowance to cover each tonne of GHG emitted into the atmosphere.⁸
- The total amount of emission units available in the market for businesses decreases each year, especially in light of Québec's GHG emission reduction targets.

Like other CAT systems around the world, Québec's CAT system allows large industrial businesses⁹ to receive a free allocation of emission units. This mitigates the effect of carbon pricing on the competitiveness of businesses exposed to international trade.

- Not all carbon pricing practices around the world are as stringent as Québec's practices, which
 prevents industrial businesses from fully reflecting the cost of carbon pricing in the price of their
 products.
- Free allocation is therefore necessary to mitigate the effect of carbon pricing on their competitiveness. It helps limit the risk of the relocating of industrial activities carried out in Québec to countries where carbon pricing is lower or even non-existent (carbon leakage).
- Even though they are covered by the CAT system, fuel distributors and electricity producers and importers do not receive a free allocation since they are not considered to be subject to the risk of carbon leakage.
 - In fact, they can reflect the cost of carbon pricing in the price of their products.

□ Free allocation rules to be defined for the period 2024-2030

The *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances* (the Regulation) establishes the rules for the operation of the CAT system, including the free allocation rules. However, for the moment, these rules only determine the calculation methods until 2023.

A draft regulation amending the Regulation is therefore being published in the *Gazette officielle du Québec* for public consultation to, among other things, establish the free allocation rules that will apply to large industrial businesses between the years 2024 and 2030.

The purpose of this document is to introduce the new rules and their estimated impact on the economy and GHG emission reduction in Québec.¹⁰

⁷ Specifically, businesses subject to the CAT system are distributors of 200 litres or more of fuels per year, large industrial emitters emitting 25 000 tonnes of CO₂ equivalent and more per year as well as electricity producers and importers. Industrial businesses reporting at least 10 000 tonnes of CO₂ equivalent and less than 25 000 tonnes of CO₂ equivalent may voluntarily join the system.

⁸ In this document, emissions in CO₂ equivalent are expressed in metric tonnes.

⁹ In this document, the term "large industrial businesses" is used to refer to industrial establishments subject to the first paragraph or the third paragraph of the second subsection of section 2 or to section 2.1 of the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*, and eligible for the free allocation of emission units under section 39 of the same regulation.

¹⁰ Throughout the document, estimates have been made based on information available as of January 31, 2022.

1.1 Québec's objectives and approach to fighting climate change

Québec has set a greenhouse gas (GHG) emissions reduction target of 37.5% in 2030 compared to 1990 levels. It also intends to make a longer-term commitment to achieve carbon neutrality (zero net emissions) in 2050.¹¹

To achieve its climate objectives, Québec has implemented the 2030 Plan for a Green Economy, which is based on:

- the CAT system, which covers nearly 80% of Québec's total GHG emissions;
 - This system guarantees GHG emission reductions over time in the sectors covered by the joint market between Québec and California. The Québec government is committed to maximizing these reductions in Québec.
- full reinvestment of revenues from the CAT system into the measures of the implementation plans of the 2030 Plan for a Green Economy;
- other statutes, regulations, policies and actions of the Québec government to fight climate change, particularly in the transportation and industrial sectors.

Other interventions and funding contribute to the reduction of GHG emissions in Québec, including those of the federal government, municipalities, and the private sector.

CHART 3



Québec's GHG emissions in 1990 and reduction objectives (million tonnes of CO₂ equivalent, unless otherwise indicated)

(1) Québec intends to make a longer-term commitment to achieve carbon neutrality in 2050.

¹¹ Moreover, Québec has already joined the coalition of federated states and regions that are signatories to the Global Climate Leadership Memorandum of Understanding (Under2 MOU), an instrument that aims to contribute to limiting global warming to less than 2°C and whose objective is to reduce emissions by 80% to 95% below the 1990 level by 2050.

1.2 A decrease in greenhouse gas emissions since 1990

According to the most recent inventory,¹² GHG emissions in Québec decreased by 3% between 1990 and 2019. This result is mainly due to:

- a 23% reduction in industrial emissions,¹³ due in particular to the gradual replacement of industrial equipment, plants and manufacturing processes, the increasing use of renewable or less emitting energies, as well as efficiency gains and production adjustments;
- a 25% decrease in emissions from the residential, commercial and institutional buildings sector, primarily due to the electrification of residential heating and improved energy efficiency;
- a 35% increase in emissions from the transportation sector, primarily due to:
 - a 194% increase in emissions from heavy-duty vehicles, used primarily for freight transportation;
 - a 27% increase in emissions from light vehicles, mainly due to the growing use of sport utility vehicles.

CHART 4

Greenhouse gas emissions in Québec – 1990 and 2019 (million tonnes of CO₂ equivalent, unless otherwise indicated)



Note: Sectors are those defined in the Québec inventory of greenhouse gas emissions. Totals may not add due to rounding. (1) Other sectors include agriculture, waste and electricity.

Source: Ministère de l'Environnement et de la Lutte contre les changements climatiques.

¹² MINISTÈRE DE L'ENVIRONNEMENT ET DE LA LUTTE CONTRE LES CHANGEMENTS CLIMATIQUES, *GES 1990-2019 : inventaire québécois des émissions de gaz à effet de serre en 2019 et leur évolution depuis 1990, 2021.*

¹³ Industrial emissions based on the Québec inventory on greenhouse gas emissions. They include emissions from large industrial businesses subject to the CAT system and those from other industries.

1.3 Carbon pricing: A growing international presence

Carbon pricing is an important tool in the fight against climate change.

 Carbon pricing makes it possible to take into account the negative impact of GHG emissions on the environment and to transfer part of the cost into the price of goods and services, which encourages more carbon-efficient behaviours.

At the international level, noteworthy progress has been achieved in recent years in the realm of carbon pricing.

 More than 60 countries, provinces, states, regions, or cities on five continents have already established a form of carbon pricing or announced their intention to do so.

Indeed, between 2010 and 2021, the proportion of global GHG emissions covered by carbon pricing rose considerably, from 5% to 22%, mainly because of the establishment of a domestic carbon market in China.

 It should be noted that in 2021, 16% of global GHG emissions were covered by a GHG emission cap-and-trade system, compared with 6% for the other carbon pricing systems.

However, despite the progression of carbon pricing globally over the last 10 years, Québec remains ahead of the rest of the world on this issue overall, with a CAT system covering nearly 80% of its emissions.

CHART 5





 Carbon tax and output-based pricing systems. Source: World Bank.

1.4 Québec's CAT system

Québec's CAT system directly covers GHG emissions from large industrial businesses.

- In 2020, 80 large industrial businesses representing 113 establishments were subject to the system.
- Moreover, the inclusion of fuel distributors in the system extends the scope of the CAT system to cover emissions from the consumption of these fuels, particularly in the transportation and building sectors as well as in smaller businesses.

Businesses subject to the CAT system must remit an emission allowance for each tonne of GHG emissions for which they are responsible.

 Therefore, in the joint Québec-California carbon market, the level of GHG emissions may not exceed the maximum amount set by the governments over the specified period (emission cap).

The maximum amount of emissions allowed decreases each year, especially in light of Québec's GHG emission reduction targets.

The caps under the CAT system have been established by government decree until 2030. They
are expected to decrease by an average of 2.34 percentage points (pp) annually from 2024
to 2030.

CHART 6

Change in Québec's GHG emission cap from 2013 to 2030 (million tonnes of CO₂ equivalent)



Source: Ministère de l'Environnement et de la Lutte contre les changements climatiques.

The CAT system: A system for achieving reductions at the lowest cost

The cap-and-trade system for greenhouse gas emission allowances is the most economically efficient way to reduce GHG emissions. This system:

- guarantees the desired GHG emission reductions in the sectors it covers;
- allows the least costly reductions to be achieved first.

In addition, Québec's CAT system has been linked to California's system since 2014, making it the largest carbon market in North America.

Québec and California have both set significant emission reduction objectives for 2030, 37.5% and 40% below their 1990 levels, respectively.

Comparison with the federal carbon pricing system

For its part, the Canadian government has implemented a carbon pricing system (federal safety net) that applies to provinces that have not implemented their own system.

- The price of carbon in this system reaches \$50 per tonne of CO₂ equivalent in 2022 and is expected to grow by \$15 per year thereafter to reach \$170 in 2030.

Québec's GHG emission caps are set by government decree until 2030 for the sectors covered by the system.

- Based on these caps, the number of GHG emission units offered annually to the sectors covered by the system will decrease from 55 million tonnes of CO₂ equivalent to 44 million tonne of CO₂ equivalent between 2021 and 2030.
- This is expected to reduce emissions in the common market by 11 million tonnes of CO₂ equivalent by 2030 compared to the 2021 level.

In comparison, it is estimated that the implementation of the federal system¹ in Québec (\$170 per tonne of CO₂ equivalent in 2030) will result in reductions of 5 million tonnes of CO₂ equivalent in the covered sectors in 2030 compared to the 2021 level.

Estimated GHG emissions reduction in 2030 relative to 2021 levels by carbon pricing system (million tonnes of CO₂ equivalent)



(1) Combined effect of the federal fuel levy for fuel distributors and the performance-based pricing system for large industrial

businesses Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

1 The federal system consists of a fuel levy for fuel distributors and a performance-based pricing system for large industrial businesses.

1.4.1 Free allocation for large industrial businesses

□ Free allocation limits the relocation of industrial activities and contributes to global climate objectives

A free allocation that is too low can harm the competitiveness of certain industrial businesses and encourage them to move part of their production to regions where carbon pricing is lower (carbon leakage) and where production emits more GHGs.

- In open economies like Québec's, industrial businesses are very exposed to international trade.
- As a result, they may have limited flexibility to reflect the cost of carbon pricing in the prices of their products, which are often set in international markets.

As a result of these shifts, carbon pricing may lead to increased GHG emissions globally.¹⁴

- By mitigating the impact of carbon pricing for Québec businesses and consequently limiting the relocation of activities to places where production is more emissive, free allocation directly serves the global objectives of fighting climate change.
- The free allocation of emission units for large industrial businesses has therefore been an important part of the CAT system since its inception.

Industrial businesses subject to the CAT system can reduce the amount they pay in carbon pricing by reducing their GHG emissions. However, the costs to them of making these reductions can be very significant.

- In some cases, reduction technologies are not yet available in the short term or are too expensive.

For their part, fuel distributors and electricity generators and importers do not receive a free allocation because they are not considered to be at risk of carbon leakage.

 In fact, they can reflect carbon pricing in the price of their products and thus encourage more carbon-efficient behaviour among consumers of these products, which is one of the objectives of their inclusion in the CAT system.

¹⁴ Indeed, production can be moved to jurisdictions where the technologies used are less efficient and where the energy used is more emissive. Considering the Québec context, where industrial production is generally powered by hydroelectricity, a shift of industrial production from Québec to other countries could increase GHG emissions on a global scale.

□ A tool widely used around the world

Free allocation of emission units is also used elsewhere in the world as a primary mitigation measure for businesses subject to a CAT system and exposed to international trade.

- For example, large industrial businesses in California that are subject to the joint carbon market with Québec receive free emission units based on product-specific thresholds and the risk of carbon leakage, among other things.
- Similarly, in the European Union, industrial businesses subject to the carbon market receive free emission units to protect sectors facing international competition.

The common challenge for governments with such systems in place is to gradually decrease the free allocation to be consistent with their reduction targets, while taking into account the ability of businesses to cope with increasing carbon costs.

□ A measure that must take into account the evolution of climate change policies on a global scale

The free allocation of a portion of emission units to Québec's industrial sector is directly linked to the CAT system, in an international context of strong competition between businesses and unequal carbon pricing practices.

However, this mitigation measure will have to take into account the evolution of climate policies outside Québec.

- For example, the eventual implementation of a border adjustment mechanism for carbon in Europe could help reduce the risk of carbon leakage in certain sectors. It could therefore justify a more pronounced decrease in the free allocation paid to businesses in these sectors.
- If all countries adopted equally stringent climate change policies, businesses subject to carbon pricing would not need mitigation measures such as free allocation.
 - Indeed, in such a context, businesses exposed to international trade would not be at a disadvantage compared to their competitors, since the latter would be subject to similar environmental constraints. Businesses would then be able to adjust their prices completely according to the carbon price.
 - This would be the case, for example, if carbon pricing were the same everywhere and carbon cost mitigation measures for large industrial businesses were reduced simultaneously, or if an international standard regulated the amount of emissions allowed for the production of a particular good.
 - In this context, free allocation could be phased out and a low carbon footprint would become an important competitive advantage for businesses and countries.

Carbon adjustment mechanisms at the border

A carbon adjustment mechanism at the border seeks to mitigate carbon-pricing differentials with trading partners so as to maintain domestic corporate competitiveness against external competition and thereby reduce the risks of relocation.

Depending on the situation, this type of mechanism can take the form of:

- import duties applied according to the carbon content of imported goods so that the carbon cost is similar to that assumed by domestic producers;
- a carbon cost offset for exported products so that the goods produced in the country remain competitive on international markets.

The European Union has tabled a draft regulation that seeks to establish such a mechanism by 2026 for the cement, steel and iron, aluminum, fertilizer, and electricity sectors.

In Canada, the federal government is examining the question and has initiated a public consultation process in this respect. The United States have also expressed an interest in this type of mechanism.

1.4.2 An increasing amount of free allocation of emission units since 2013 due to economic growth

Overall, there are two components that determine a business's total amount of free allocation in the CAT system, namely:

- the emissions target per unit produced (target intensity), based in part on the establishment's historical data;
- the level of production, as the free allocation to an establishment changes in proportion to its production.

Based on projected economic growth, it is estimated that the total volume of free allocation should increase by 6% between 2013 and 2023.¹⁵

 Free allocation per unit produced is expected to decrease by 9% between the baseline period of the system (2007-2010) and the year 2023 as a result of the free allocation rules in place until 2023.¹⁶

CHART 8

- However, average production is expected to increase by 13% over the same period.

CHART 7

Change in the total volume of free allocation from 2013 to 2023

(million tonnes of CO₂ equivalent)

Change in average production and free allocation per unit produced (percentage of production and average emission intensity for 2007-2010)



2013	20	15	201	17	20	19	20	21	20)23

Note: Observed data from 2013 to 2020 and projection for subsequent years based on economic growth forecast in the November 2021 *Update on Québec's Economic and Financial Situation.*

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.



Note: Observed data from 2013 to 2020 and projection for subsequent years based on economic growth forecast in the November 2021 Update on Québec's Economic and Financial Situation.

¹⁵ Projection based on the economic forecasts of the November 2021 *Update on Québec's Economic and Financial Situation*, which forecast a 20% increase in Québec's real GDP from 2013 to 2023.

¹⁶ A reminder of the free allocation rules applied for the period 2013 to 2023 is presented in Appendix 2.

2. AN APPROACH CONSISTENT WITH QUÉBEC'S CLIMATE OBJECTIVES

2.1 A balanced approach to the fight against climate change

The need to establish the free allocation rules for the period 2024-2030 is an opportunity to improve the free allocation system, building on the experience gained since the creation of the CAT system in 2013.

The new free allocation rules will make it possible to adapt the approach to certain realities that have been observed in recent years.

- On the one hand, the level of free allocation remains high to this day, which is not sustainable in the long term, as emission caps decrease every year in Québec.
- On the other hand, gaps between the level of free allocation and actual emissions have emerged over the years for some businesses.

As such, the new rules aim to:

- ensure a decrease in the level of free allocation granted that is in line with Québec's climate objectives, including the target to reduce GHG emissions to 37.5% below the 1990 level in 2030;
- maintaining the competitiveness of the industrial sector given Québec's lead in the realm of carbon pricing compared to its main competitors;
- accelerate business investment in their climate transition;
- adapt free allocation to the new realities of businesses in order to mitigate some of the gaps that may have developed since the system's implementation.

Greater consistency with Québec's climate objectives is needed

Over the long term, the total amount of emission units granted in free allocation in the CAT system must remain consistent with the decrease in the system's emission caps.

- The level of free allocation remained relatively stable between 2013 and 2020. It is expected to
 increase by 2023 as a result of economic growth.
- However, GHG emission caps will decrease until 2030. They will need to keep decreasing after 2030, in line with Québec's 2050 carbon zero objective.

A gradual reduction in the total level of free allocation granted to businesses is therefore needed to ensure consistency with Québec's climate objectives.

Without a change in the trajectory of the free allocation system, all GHG emission units would end up being allocated free of charge to the industrial sector.

In fact, the free allocation granted to an establishment changes in proportion to its production.
 For the industrial sector as a whole, the expected economic growth therefore puts upward pressure on the total volume of free emission units allocated.

It is therefore preferable to gradually adjust the trajectory of free allocation now, rather than to act precipitously starting in 2030, in a context of carbon neutrality by 2050.

CHART 9





Note: Observed data from 2013 to 2020 and projection for subsequent years based on economic growth forecast in the November 2021 Update on Québec's Economic and Financial Situation.

(1) Linear extrapolation between the 2030 cap and a reduction in emissions from the sectors covered by the CAT system of 95% in 2050 compared to 1990.

(2) Historical and projected free allocation. The total level of free allocation shown for the period 2024-2050 is the one that would be reached if free allocation per unit produced were maintained at the prescribed level for 2023.

Growing gaps between establishments

The calculation method used to establish the free allocation is based on the average performance of the establishments over the period 2007-2010. However, this performance has changed since then.

Differences between the level of free allocation and current emissions have appeared over the years for some businesses. Some of them receive more allowances than they emit GHGs, while others have to purchase an increasing quantity of allowances.

- These disparities may reflect the variability of reduction costs between businesses.
 - Since 2007-2010, some establishments were able to improve their performance in terms of GHG emissions and obtain a surplus of free allocation (excess allowances), which is one of the mechanisms provided for in the CAT system.
 - Other establishments experienced slower performance improvements than the reduction in free allocation. They will need to purchase an increasing quantity of allowances.
- In other situations, the gaps reflect the difficulty, under the current rules, of tailoring the free allocation to the realities faced by establishments.
 - For example, an establishment may be required to change its source of raw materials, which may result in an increase in its GHG emissions.

Without changes to the free allocation rules, these differences will increase over time as the value of the allowances increases.

It is necessary to mitigate the observed differences in order to reduce the free allocation in an equitable manner and be consistent with Québec's climate objectives.

CHART 10

CHART 11

Level of free allocation and GHG emissions to cover (million tonnes of CO₂ equivalent)



2013 2015 2017 2019 2021 2023

Note: Observed data from 2013 to 2020 and projection for subsequent years based on economic growth forecast in the November 2021 *Update on Québec's Economic and Financial Situation* and without improvement in the performance of businesses in terms of GHG emissions. Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances





Note: Observed data from 2013 to 2020 and projection for subsequent years based on assumptions of no improvement in business performance, constant production, and continuation from 2024 to 2030 of prescribed rules for 2023. The value of the allowances to purchase presented does not take into account the excess allowances accumulated by some businesses.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

du Québec.

2.2 The new free allocation rules for the period 2024-2030

Overall, the proposed approach for the period 2024-2030 introduces new parameters in the calculation of the free allocation compared to the current rules.¹⁷

Indeed, the proposition provides for:¹⁸

- a gradual decrease in the overall level of free allocation granted, consistent with the decrease in emission caps and the 2030 reduction target;
- a modulation of the reduction rate of the free allocation according to the risk of relocation of establishments;
- the consideration, in the calculation of the free allocation, of more recent business intensity performance in terms of GHG emissions in order to adapt to new business realities;
- the consignment, on behalf of businesses, of a portion of the emission units resulting from the reduction in the level of free allocation.
 - Revenues from the auctioning of the consigned units will be reserved on behalf of each business to finance projects related to their climate transition.

As such, the new free allocation rules will make it possible to grant free emission units to industrial businesses in the two following ways:

- free allocation granted,¹⁹ which may be used by businesses to ensure their current or future compliance;
- consigned free allocation,²⁰ which may be used to finance projects to reduce GHG emissions.

¹⁷ The detailed approach is set out in Appendix 3.

¹⁸ Work on the 2024-2030 free allocation is the result of a collaboration between several government departments and one organization of the Québec government, namely the Ministère de l'Environnement et de la Lutte contre les changements climatiques, the Ministère de l'Économie et de l'Innovation, the Ministère des Finances, the Ministère des Forêts, de la Faune et des Parcs, the Ministère de l'Énergie et des Ressources naturelles and the Société du Plan Nord.

¹⁹ This would be the same type of free allocation that will have been paid between 2013 and 2023.

²⁰ In this document, the term "consignment" or "consigned free allocation" is used to refer to the portion of the free allocation intended for auction, as defined in the proposed regulations amending the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances.*

A reduction in the free allocation for each establishment

Between 2024 and 2030, the new proposed approach will decrease the free allocation granted by between 1.30 pp to 4.20 pp per year, depending on the establishment and the year. The decrease will be primarily the result of the addition of three components.²¹

- Cap decline factor: a base reduction of 2.34 pp will be made annually for each industrial establishment. The reduction corresponds to the annual decrease in the CAT system emission unit cap between the years 2024 and 2030.
- Expected additional effort: a modulation between -0.54 pp and 1.36 pp will be applied annually, depending on the level of competitiveness risk and the share of fixed process emissions of the establishments.
- Trajectory adjustment factor: this factor will allow for a slower decrease in the free allocation granted to businesses in the short term to take into account Québec's lead in terms of carbon pricing.
 - However, it will also progressively accelerate the decrease by 2030.
 - Its effect will be −0.5 pp per year at the start of the period and 0.5 pp per year at the end. However, it will be zero on average over the entire 2024-2030 period.

Therefore, under the effect of all the parameters of the approach, each business will see its free allocation granted decrease progressively between 2024 and 2030.²²

TABLE 4

Main factors of reduction of the free allocation per unit produced (percentage points)

Elements of the approach	Value
Cap decline factor	2.34
Expected additional effort ⁽¹⁾	Between -0.54 and 1.36
Trajectory adjustment factor ⁽²⁾	Between −0.50 and 0,50 (zero on average for 2024-2030)
TOTAL	Between 1.30 and 4.20

Note: The free allocation per unit produced could decrease more or less rapidly than presented for a given establishment due to the gradual incorporation of the average establishment performance in terms of GHG emissions observed from 2017 to 2019 into the target intensity.

(1) Varies by level of competitiveness risk and share of fixed process emissions at the establishment.

(2) Varies according to the year considered.

²¹ The sum of these parameters determines the reduction in the free allocation granted per unit produced by an establishment. In this document, the parameters have been rounded to the nearest hundredth for simplicity purposes. The precise parameters of the approach are available in the proposed regulation amending the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*.

²² An example of the calculation of the free allocation is provided in Appendix 4.

2.2.1 Reducing the free allocation by taking into account the risk of relocation

D Taking into account the risk to competitiveness

For the period 2024-2030, the expected additional effort will vary between -0.54 pp and 1.36 pp per year, depending on the establishment. This factor will be in addition to the other components of the annual free allocation reduction.

Businesses will be classified into seven levels of competitiveness risk (levels 1 to 7).23

- A business's level will be determined by its exposure to international trade as well as by the importance of its GHG emissions in the value creation process.
- This modulation will globally allow for a better adjustment of the reduction of the free allocation by requiring a higher effort from establishments with a lower relative risk of harm to competitiveness.

More specifically:

- sectors with less than 20% exposure to international trade will automatically be classified as Level 1;
- businesses with more than 20% exposure to international trade will be classified in different levels according to the importance of their GHG emissions in their value creation process (GDP).
 - Each increment of 1 000 tonnes of CO₂ equivalent per million dollars of GDP will result in a higher risk ranking, up to the maximum level of 7.

ILLUSTRATION 1

Ranking of businesses according to the importance of emissions in the value creation process



²³ See Appendix 3 for a detailed presentation of the methodology for determining competitiveness risk levels.

D Taking into account the relative importance of fixed process emissions

Fixed process emissions are recognized as being more costly to reduce. They are caused in particular by chemical reactions in a manufacturing process.

To account for this, the expected additional effort determined for each of the risk levels will be reduced by 0.27 pp for businesses whose fixed process emissions represent 50% or more of their total emissions.

 For example, a business classified as risk level 3 whose fixed process emissions represent more than 50% of its total emissions would have a lower expected additional effort of 0.54 pp per year (compared to 0.82 pp per year if its fixed process emissions represented less than 50% of its total emissions).

CHART 12

Expected additional effort by level of competitiveness risk and relative importance of fixed process emissions

(percentage point per year) 1.36 Expected additional effort if fixed process 1.09 1.09 emissions $\geq 50\%$ Expected additional effort if fixed process 0.82 0.82 emissions < 50% 0.54 0.54 0.27 0.27 Level 7 (highest 0.00 Level 6 risk) 0.00 Level 1 Level 2 Level 3 Level 4 Level 5 (lower risk) -0.27 -0.27 -0.54

2.2.2 Gradually accelerating the reduction of free allocation

Québec is currently ahead of the rest of the world in terms of carbon pricing. To reflect this lead, the annual reduction in the free allocation granted to businesses will be less pronounced in the short term.

 For example, in 2024 and 2025, the trajectory adjustment factor will slow the decline in the free allocation granted by 0.5 pp per year for all businesses.

Conversely, the decline in the free allocation granted will gradually accelerate thereafter through 2030, so that the volume of free allocation granted in 2030 is consistent with Québec's climate objectives.

 For example, in 2029 and 2030, the trajectory adjustment factor will increase the decline in free allocation granted by 0.5 pp per year for all businesses.

This gradual acceleration will allow more time for businesses to invest in their climate transition and adjust to the expected reductions in free allocation granted.

TABLE 5

Changes in the trajectory adjustment factor
(percentage point per year)

Year	Trajectory adjustment factor
2024	-0.50
2025	-0.50
2026	-0.25
2027	0.00
2028	0.25
2029	0.50
2030	0.50
AVERAGE 2024-2030	0.00

Measuring the comparative evolution of international carbon pricing practices through the carbon pricing ratio

Québec is globally ahead of the rest of the world in terms of carbon pricing. To measure this lead, we can refer to the carbon pricing ratio developed by the government in collaboration with international partners.

Overall, the ratio will reflect the relationship between average carbon pricing in Québec and pricing elsewhere in the world. It simultaneously considers the explicit price of one tonne of GHGs, and the proportion of emissions covered in all jurisdictions the world over.

- The ratio decreases when the global average carbon price increases more rapidly than that of Québec.
- Conversely, the ratio increases if the average carbon price increases faster in Québec than in the rest
 of the world.

For 2019, the estimated value of the ratio is 6.4, which means that carbon pricing is roughly six times more present in Québec than in the rest of the world.

- The average price in Québec was US\$12.90 in 2019. This result is obtained by multiplying the average price of emission allowances in the CAT system (US\$16.78 per tonne of CO₂ equivalent in 2019) by the proportion of Québec's emissions covered by the CAT system according to the most recent assessment (76.9% in 2019).
- The average carbon price in the rest of the world was US\$2.02 per tonne of CO₂ equivalent.
- Dividing the first term by the second gives a ratio of 6.4.

Changes in the carbon pricing ratio

While this ratio does not determine the level of free allocation granted, it will be measured and published annually based on data from an independent provider. A technical note is available for more details on the methodology used.¹



For more information on the methodology for calculating the carbon pricing ratio, please see the technical paper available at: http://www.finances.gouv.gc.ca/documents/Autres/en/AUTEN_TechnicalManual.pdf.

2.2.3 Taking into account recent business performance

The emissions per unit produced target (target intensity) used to calculate the free allocation for most establishments is based primarily on their GHG emissions performance for the years 2007 to 2010.

However, the performance of some businesses has changed significantly in recent years, which may make the target intensities used in the calculation less representative of reality.

 For example, some businesses may have improved their performance faster than their target intensity has decreased. Other factors may also have changed the performance of businesses, such as when a change in source of supply is required.

A new way of calculating the emissions intensity target will therefore be introduced from 2024 onwards, to take into account more recent performance of establishments in terms of emissions per unit produced (actual emission intensity).

- As such, the average actual emission intensity for the years 2017 to 2019 will be phased into the target intensity at a rate of 10% annually.

This will allow for the phased-in inclusion of the new reality of businesses, bringing the target intensity closer to the average actual intensity for 2017-2019, while recognizing the GHG emission reduction efforts made since the creation of the CAT system.

- For a business purchasing emission allowances (emissions greater than the free allocation received), the target intensity will gradually increase, which will mitigate the reduction of the free allocation.24
- For a business with excess allowances (emissions less than the free allocation), the target intensity will gradually decrease, increasing the extent of the reduction.

ILLUSTRATION 2

ILLUSTRATION 3



Note: Establishment purchasing emission allowances in 2023. All other impacts are equal.



110

Actual intensity 2017-2019

103

Target intensity

Note: Establishment with excess allowances in 2023. All other impacts are equal.

²⁴ However, a mechanism is provided to ensure that the free allocation per unit produced of an establishment does not exceed its free allocation per unit produced that is granted in 2023.

2.2.4 Consignment: a lever to accelerate the climate transition

According to the proposed parameters, the free allocation granted per unit produced should decrease between 1.30 pp and 4.20 pp annually, depending on the year considered and the level of risk to the competitiveness of the businesses.

A significant portion of the emission units resulting from the reduction in the level of free allocation will be consigned on behalf of the business to finance its GHG emission reduction or research and development projects related to the climate transition.

- On the one hand, the emission units corresponding to the annual reduction of 1 pp of the free allocation granted will be sold at auction.
 - The money from these sales will be paid into the Electrification and Climate Change Fund (ECCF), to finance the measures of the 2030 Plan for a Green Economy.
- On the other hand, the emission units corresponding to the annual reduction of the free allocation granted exceeding 1 pp will be consigned on behalf of each business.
 - The sums resulting from their sale will be set aside for a period of five years on behalf of each business to finance its efforts related to the climate transition.

The 2024-2030 free allocation rules therefore represent a change in the composition of the free allocation.

 In fact, the free allocation would now be composed of both emission units allocated free of charge (free allocation granted) and consigned units.

ILLUSTRATION 4

Change in the composition of the free allocation



(1) Maintaining the free allocation per unit produced at the prescribed level for 2023 through 2030.
□ A flexible mechanism to facilitate investments

The use of the funds generated by the consigned units will be flexible, with the aim of encouraging investments that facilitate the climate transition of businesses. In particular, the choice of GHG emission reduction projects to be implemented will be left to the establishment.

 The main requirement will be that the project be supported by a techno-economic potential study²⁵ validated by an external firm and that it allows the business to reduce its GHG emissions.²⁶

In addition, the monies generated from the consigned units could:

- be used to finance the operating cost differential between fossil fuels and forms of energy from renewable sources that are part of a pre-established list,²⁷ which is not the norm in the usual programs;
- be shared among different establishments within a business,²⁸ to encourage larger investments within a single establishment;
- be used in conjunction with other Québec government programs without reducing the funding threshold, which will encourage the realization of projects, in a context where such projects often require major investments.

If the funds are not used by the business within five years of their availability, they will be transferred to the ECCF to finance other measures to fight climate change.

Enhanced support for the industrial sector

The first implementation plan of the 2030 Plan for a Green Economy, released in the fall of 2020, provided \$768 million by 2026 to support the industrial sector through various measures to reduce GHG emissions and the emergence of new technologies. This plan is reviewed annually.

In particular, Québec has put in place new support measures, including:

- the Assistance measure for the decarbonization of Québec's industrial sector (MADI), whose parameters are similar to those of the consignment. The objective of the MADI is to finance GHG emission reduction projects before the new free allocation rules come into effect;
- the establishment of the GHG Intervention Group to assist businesses in choosing reduction projects and in seeking financing;
- a call for projects to finance projects not covered by current government programs.

These measures are in addition to existing programs such as ÉcoPerformance and Technoclimat.

²⁵ A techno-economic potential study provides a portrait of all the potential reduction projects of a business. It describes the level of maturity of the technologies involved, the costs and the expected GHG emissions reduction.

²⁶ Technological innovation projects in the area of GHG emissions reduction will also be eligible.

²⁷ Energies eligible for incremental operating cost funding include renewable electricity, green hydrogen, first generation renewable natural gas, waste biomass and bioenergy produced by pyrolysis from waste forest biomass. Depending on the evolution of knowledge, the list of eligible energies could be adjusted.

²⁸ Amounts could also be shared among establishments in the same control group as defined in section 9 of the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances.*

Climate transition will have different impacts in different sectors

The Canadian Institute for Climate Choices released a report in October 2021 entitled *Sink or Swim: Transforming Canada's Economy for a Global Low-Carbon Future.*

According to the report, the performance of certain sectors is expected to grow by 2050 due to an increase in demand for goods and services compatible with the climate transition. These sectors include low-emission energy production, biofuels and batteries.

Conversely, other sectors, such as oil and gas, will have limited opportunities to benefit from the climate transition due to the expected decline in demand for their products.

 In these sectors, it will be preferable for businesses to shift their production to take advantage of the climate transition. For example, refineries could shift to biofuel production.

In most sectors, however, the effect of the climate transition on profitability is uncertain. Generally, the transition could be beneficial provided that investments are made to decarbonize production processes. Sectors targeted include aluminum, iron and steel, and cement production.

In these sectors, investments in lower-emission technologies will allow businesses to avoid the costs
of carbon pricing and border adjustment mechanisms for carbon around the world.

Québec is well positioned to benefit from the climate transition

In Québec, the last situation described applies to several sectors covered by the new free allocation rules.

These new rules will encourage investments in GHG emissions reduction. In addition, the first implementation plan of the 2030 Plan for a Green Economy includes several measures to support the industrial sector in this regard.

 Québec's industrial businesses will be able to benefit as much as possible from the opportunities arising from the climate transition, by positioning themselves favourably in tomorrow's more low-carbon world.

Effect of the climate transition on profitability in 2050 by sector

Effect on profitability	Examples of sectors affected
Clear opportunities	Low-emission energy production, biofuels, batteries and storage, fuel cells, solar and wind equipment
Potential opportunities	Iron and steel, cement, concrete and aggregates, aluminum, automotive and parts manufacturing, uranium, mining and mineral products, airlines, chemicals, plastics, and rubber materials
Limited opportunities	Oil and gas exploration and development, other oil and gas related sectors, heavy duty vehicle manufacturing, coal mining

Source: Canadian Institute for Climate Choices, Sink or Swim: Transforming Canada's Economy for a Global Low-Carbon Future, [Online], 2021, [https://climateinstitute.ca/reports/sink-or-swim/].

3. IMPACTS ON THE ECONOMY AND GHG EMISSIONS REDUCTION

This section illustrates the effects of the proposed new free allocation rules for the period 2024-2030 on the economy and GHG emissions reduction.

First, the effect of the new rules on the overall level of free allocation as well as the financial impact of the proposal on large industrial businesses are estimated.

- To present the effect of the proposed changes, businesses' production and GHG emissions performance are assumed to be constant until 2030, unless otherwise specified.
- The financial impact is obtained primarily by comparing the value of the resulting emission allowance purchases with the value of the purchases that would occur if the free allocation per unit produced were maintained through 2030 at the level prescribed for 2023.²⁹

Secondly, the macroeconomic effects of the rules are presented, which take into account:

- the expected changes in the level of production and prices in the economy, according to the most recent economic and financial forecast scenario of the Ministère des Finances du Québec;
- changes in the behaviour of economic agents and the adoption of new technologies as a result of the price signal associated with the reduction in the free allocation, the use of the amounts resulting from consignment, and the reinvestment of the additional revenues generated by the new rules in the other measures of the 2030 Plan for a Green Economy.

In all the estimates made, a price scenario of 97 per tonne of CO₂ equivalent in 2030 is used, which reflects private sector estimates.

CHART 13

GHG emissions price scenario from 2021 to 2030 (Canadian dollars per tonne of CO₂ equivalent)



(1) The CAT system provides a mechanism to prevent the price of GHG emission units from rising too high, through the Minister's reserve account. There are three categories of reserves. The price cap presented in the chart is the estimated price for emission units in the Minister's reserve Class C, the reserve with the highest price.

(2) Observed data from 2013 to 2021.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

²⁹ Assumptions for estimating financial impacts are presented on page 35.

3.1 A decrease in the free allocation granted consistent with Québec's climate objectives

It is estimated that the total volume of free allocation granted to large industrial businesses should decrease starting in 2024 as a result of the proposed free allocation rules for the 2024-2030 period, despite the expected increase in industrial production.

In fact, taking into account the projected economic growth, the level of free allocation granted to businesses is expected to decrease by 2.9 million tonnes of CO_2 equivalent between 2023 and 2030.

- However, if all free allocation units were taken into account, including those consigned on behalf of businesses, the decrease would be smaller.
- For comparison, maintaining the free allocation per unit produced at the level prescribed for 2023 would result in an increase in free allocation of 0.9 million tonnes of CO₂ equivalent between 2023 and 2030.

In addition, it is estimated that under the proposed rules, the average proportion of free allocation granted to businesses per unit produced is expected to fall from 91% in 2023 to 75% in 2030 relative to their baseline intensity.

With the consigned units, however, this proportion rises to 85% in 2030.

CHART 14

Total volume of free allocation

Maintaining free allocation per unit produced at the level prescribed for 2023

CHART 15

Average proportion of free allocation per unit produced (percentage of 2007-2010 baseline emissions

(million tonnes of CO2 equivalent) intensity) 98 21.0 196



20 1

2013 2017 2021 2025 2029

Note: Observed data from 2013 to 2020 and projection for subsequent years, including the effect of projected economic growth on production growth.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.



Note: Observed data from 2013 to 2020 and projection for subsequent years. The increase for 2021 is attributable to the application of the 2021-2023 free allocation rules. Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

□ A larger reduction in the free allocation granted than between 2013 and 2023

The new rules could result in a decrease in the level of free allocation granted per unit produced by an average of 2.7% annually between 2024 and 2030, which would vary by business, primarily based on:

- the relative risk to the competitiveness of businesses and the share of their fixed process emissions;
- the inclusion of more recent actual GHG emissions intensity performance of businesses in the calculation of the total free allocation.

This decrease is about three times larger than the average annual reduction of 0.8% estimated for the period 2013-2023.

Therefore, for the entire 2013-2030 period, the annual reduction in the level of the free allocation granted to large industrial businesses is projected to average 1.6%.

TABLE 6

Average reduction in the free allocation granted to businesses per unit produced (average annual change, in percentage)

	2013-2023	2024-2030 ⁽¹⁾	2013-2030
Pulp and paper	-1.9	-3.7	-2.6
Chemicals and refineries	-1.3	-3.3	-2.1
Mining, pelletizing and metallurgy	-1.0	-2.4	-1.6
Aluminum	-0.2	-3.0	-1.3
Cement and lime	-0.8	-1.9	-1.2
Others ⁽²⁾	-2.3	-3.0	-2.6
ALL LARGE INDUSTRIAL BUSINESSES	-0.8	-2.7	-1.6

Note: The reduction effort is calculated as the reduction, over a given period, of the free allocation granted to establishments per unit produced, relative to the reference intensity calculated over the period 2007-2010. For each sector, the average reduction effort of establishments is reported.

(1) Annual reduction estimated with all the parameters of the proposal.

(2) Most of the emissions of establishments in the "Others" category are combustion emissions, for which the free allocation level is lower than for fixed process emissions.

3.2 Financial impact for large industrial businesses

□ A potential financial impact of \$671 million over the period 2024-2030

Over the period 2024-2030, it is estimated that the new rules could have an additional financial impact of \$671 million for all industrial businesses currently subject to the CAT system, compared to a situation where the free allocation per unit produced would be maintained at the level prescribed for 2023.

 In addition, \$581 million would be set aside for businesses from the auction of consigned emission units.³⁰

The cumulative financial impact of \$671 million corresponds to an average cost of approximately \$5 per tonne of CO₂ equivalent emitted over the entire 2024-2030 period.

TABLE 7

Cumulative potential financial impact of the new free allocation rules from 2024 to 2030 (millions of dollars, unless otherwise indicated)

	Cumulative financial impact over the period 2024-2030	Average annual financial impact	Cost per tonne of emissions (dollars)
Pulp and paper ⁽¹⁾	48	7	5
Chemistry and refineries	190	27	7
Mining, pelletizing and metallurgy	151	22	5
Aluminum	163	23	4
Cement and lime	105	15	4
Others ⁽²⁾	15	2	4
ALL LARGE INDUSTRIAL BUSINESSES	671	96	5

Note: Estimates with no improvement in business performance in terms of GHG emissions and with constant production.

(1) Financial impact includes costs associated with covering emissions from cogeneration, an activity not eligible for free allocation.

(2) Most of the emissions of establishments in the "Others" category are combustion emissions, for which the free allocation level is lower than for fixed process emissions.

³⁰ The value of the total reduction in free allocation granted (reduction of excess allowances and additional purchases of emission allowances) is estimated at \$963 million over the period 2024 2030.

Assumptions for estimating financial impacts

The proposed free allocation rules for the period 2024-2030 will have different impacts on businesses.

In this document, the concept of financial impact refers to the value of the emission allowance purchases required to close the gap between the amount of emission units allocated to an establishment free of charge and its GHG emissions to be covered.

- Unless otherwise indicated, the financial impact presented shows the value of additional emission allowance purchases with the proposed free allocation rules, compared to the value of purchases that would occur if the level of free allocation per unit produced were maintained through 2030 at the level prescribed for 2023.
- For the purposes of calculating the financial impact, the production level and GHG performance of subject businesses are assumed to be fixed from 2019 to 2030.¹
- Also, the ability of large industrial businesses to pass on a share of the carbon cost to consumers is assumed to be zero.

The value of emission units reduced at an establishment in a surplus position (over-allocation) is therefore not included in the estimation of financial impacts, unless otherwise indicated.

 For example, the financial impact for an establishment in a particular year is considered zero if, during that year, the establishment receives more emission units for free than it has to cover.

Moreover, the excess allowances accumulated by some businesses are not considered in the estimation of the financial impact.

 In some cases, however, the excess free units received make it possible to generate a profit when a reduction project is implemented and its break-even point has been reached.

Finally, the financial impact is valued at the price of the units of the current year for which the difference between the quantity of emission units distributed free of charge to an establishment and its GHG emissions to be covered is noted.

There is no consideration of the possibility for businesses to take advantage of the various purchasing and compliance strategies that the cap-and-trade system for greenhouse gas emission allowances (CAT system) allows (purchases of future emission units, offset credits, accumulation of emission allowances, etc.).

The financial impact presented therefore illustrates the effect of the new free allocation rules on the purchase of emission allowances, in the situation where no business would modify its production and technology choices or improve its practices.

- In reality, businesses will adjust their strategies and adopt new technologies to adapt to the effect of the new rules. This will reduce the financial impact of a reduction in the free allocation.
- The actual cost to businesses of the proposed approach will depend on how they reduce their GHG
 emissions and how they use the money they receive from consigned emission units.

1 A sensitivity analysis of the financial impacts of improved business performance is presented in Appendix 5.

Q Reduction in free allocation: total potential value of \$963 million

Based on the assumptions used to calculate the financial impact, the total value of the reduction in the number of emission units paid in free allocation would be \$963 million between 2024 and 2030, compared to a situation where the free allocation per unit produced would be maintained at the level prescribed for 2023.

In fact, the decrease in the free allocation granted to large industrial businesses is explained by two components:

- the free allocation granted to businesses purchasing allowances (financial impact), estimated at \$671 million over the period 2024-2030;
- the reduction in the number of excess allowances for businesses in an over-allocation situation,³¹ estimated at \$292 million over the period 2024-2030.

However, a significant portion of this \$963 million would be made available to businesses to carry out their GHG emission reduction projects, as these amounts would result from the auctioning of emission units consigned to their name.

TABLE 8

Total value of the decrease in the number of units granted in free allocation (millions of dollars)

	2024	2025	2026	2027	2028	2029	2030	Total
Additional allowances to purchase (financial impact)	7	18	39	70	115	174	248	671
Reduction of excess allowances	11	23	32	41	52	62	72	292
TOTAL VALUE OF REDUCED UNITS	17	41	70	112	166	236	320	963

Note: Estimates with no improvement in the performance of businesses in terms of GHG emissions and with constant production. Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

³¹ A business in an over-allocation situation (excess allowances) is a business whose emissions are lower than the free allocation it receives each year. Since 2007-2010, some businesses have been able to improve their GHG emission performance more quickly than the reduction in their free allocation. They have therefore been able to generate a surplus of free allocation.

The over-allocation is expected to decrease over time

Since 2007-2010, some establishments have been able to improve their GHG emission performance faster than the reduction in free allocation that was imposed on them.

This has allowed them to obtain a surplus of free allocation (excess allowances), which they
have been able to use to finance the investments that generated these reductions. This is one
of the mechanisms provided for in the CAT system.

If the free allocation per unit produced remained at the level prescribed for 2023, it is estimated that the value of the excess allowances granted to businesses in an over-allocation situation would reach \$378 million over the entire 2024-2030 period.

However, the proposed new free allocation rules are expected to result in a reduction of \$292 million in excess allowances granted to businesses (over-allocation) over the period 2024-2030, compared to maintaining the prescribed rules for 2023 until 2030.

TABLE 9

Annual value of excess allowances paid between 2024 and 2030

(millions of dollars)

	2024	2025	2026	2027	2028	2029	2030	Total
Excess allowances with maintenance of rules ⁽¹⁾	38	43	46	52	59	66	74	378
Excess allowances with the new rules	27	20	15	11	7	4	2	86
REDUCTION OF EXCESS ALLOWANCES	11	23	32	41	52	62	72	292

Note: Estimates without improvement in the performance of businesses in terms of GHG emissions and with constant production. The value of excess allowances could be higher if businesses in an over-allocation situation improved their performance.

(1) Based on the assumption that the free allocation rules prescribed for 2023 are maintained for the period 2024-2030. Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

□ Approximately 60% of the reduction will be used to support green projects in the industrial sector

Approximately 60% of the free allocation reduction will be consigned to industrial businesses between 2024 and 2030.

- The money from the auction of these emission units will be set aside for a period of five years on behalf of each business to fund its climate transition efforts.
- The rest of the money associated with the decrease in the free allocation will go into the ECCF, which includes funding for multiple initiatives in different sectors of the economy.

TABLE 10

Value of consigned allowances and additional amounts paid into the ECCF from 2024 to 2030

(millions of dollars)

	Value of consigned allowances	Additional amounts paid into the ECCF ⁽¹⁾	Total value of reduced units
Pulp and paper	70	10	80
Chemistry and refineries	169	60	229
Mining, pelletizing and metallurgy	106	65	171
Aluminum	155	166	321
Cement and lime	53	83	137
Others ⁽²⁾	28	0	28
TOTAL	581	382	963

Note: Estimates based on constant production. Totals may not add due to rounding.

(1) These amounts are derived from the auctioning of emission units that were previously allocated free of charge.

(2) The majority of emissions from the "Others" category are combustion emissions, for which the level of free allocation is lower than for fixed process emissions.

A financial impact in addition to that of the rules prescribed until 2023

The financial impact of the new free allocation rules for industrial businesses is in addition to the impact that would occur if the free allocation per unit produced were maintained through 2030 at the level prescribed for 2023.

- This is because the free allocation rules over the 2013 to 2023 period also require reductions in free allocation, which vary from one business to another.
- Purchases of emission allowances that would be made if the rules prescribed for 2023 were maintained until 2030 are estimated at \$500 million for the period 2024-2030.

The CAT system: an average cost of \$9 per tonne for large industrial businesses

Taking into account the level of effort required in 2023 and carried over to the 2024-2030 period, the total financial impact of the free allocation rules could represent \$1.2 billion for businesses that will have to purchase emission allowances.

Therefore, the total financial impact of the CAT system would be an average cost of about \$9 per tonne of CO₂ equivalent emitted from 2024 to 2030 for large industrial businesses.

In comparison, an average price of approximately \$70 per tonne of CO₂ equivalent over the entire 2024-2030 period was used for these analyses.

Total financial impact of the CAT system from 2024 to 2030

(millions of dollars, unless otherwise indicated)

	Financial impact of maintaining the rules ⁽¹⁾	Financial impact of the new rules	Total financial impact	Cost per tonne of CO ₂ equivalent of emissions (dollars)
Pulp and paper ⁽²⁾	141	48	190	20
Chemistry and refineries	117	190	306	11
Mining, pelletizing and metallurgy	94	151	245	9
Aluminum	34	163	197	5
Cement and lime	52	105	157	6
Others ⁽³⁾	62	15	76	19
TOTAL	500	671	1 171	9

Note: Estimates without improvement in the performance of businesses in terms of GHG emissions and with constant production. (1) This financial impact is based on the assumption that the free allocation rules prescribed for 2023 are maintained for the period 2024-2030.

(2) Financial impact includes costs associated with covering emissions from cogeneration, an activity not eligible for free allocation.
 (3) The majority of emissions from the "Others" category are combustion emissions, for which the level of free allocation is lower than for fixed process emissions.

3.3 Impacts on the economy and GHG emissions reduction

The new free allocation rules are part of a balanced approach to the fight against climate change.

- On the one hand, the reduction in free allocation will increase the cost to some businesses, who will have to reduce their GHG emissions or purchase additional emission allowances to cover their emissions.
- On the other hand, the new rules will also result in additional revenues, which will be reinvested in the implementation plan of the 2030 Plan for a Green Economy.
 - In particular, a significant portion of the additional revenue will be generated by the auctioning of emission units consigned on behalf of large industrial businesses, and the proceeds will be earmarked to fund their GHG emission reduction projects.

Both of these effects will encourage changes in the behaviour of businesses.

 For example, they could lead to the use of new technologies, a switch to less emissive energies, and efficiency gains.

□ A limited impact of \$57 million on Québec's real GDP in 2030

It is estimated that the new free allocation rules will have a small negative impact of \$57 million on Québec's real GDP in 2030 (less than 0.1%), compared to a situation where the free allocation per unit produced is maintained at the level prescribed for 2023.

This impact on the economy would result from:

- an increase in business investment, associated with the completion of green projects;
- a decrease in net exports, particularly due to an increase in imports, which have a downward effect on GDP.

This estimate considers only the effect of the new free allocation rules. The overall effect of the CAT system and the measures of the first implementation plan of the 2030 Plan for a Green Economy, especially those aimed at supporting the industrial sector in reducing its emissions, is excluded.

TABLE 11

Financial impact of the new free allocation rules in 2030

(millions of dollars, in real terms)

	2024-2030 free allocation rules
Consumption	_
Investment	72
Net exports	-129
Government spending	_
TOTAL – GDP	-57
Household disposable income	-5
Jobs (in full-time equivalent jobs)	-430

Note: The impact analyses take into account the effects of the CAT system and the reinvestment of revenues from the CAT system in the implementation plan of the 2030 Plan for a Green Economy. They do not take into account the implementation of additional actions to fight climate change in Québec and in the rest of the world. These estimates are based on information available in January 2022 and on the GHG emission projections made in the 2020-2021 budget.

Model used for the impact analyses

The general equilibrium model of the Ministère des Finances du Québec for the environment (MEGFQ-E) was used to conduct the economic impact analyses of the new free allocation rules.

The model represents the Québec economy as an elaborate system of equations.

- The model details the entire structure of the economy, and therefore takes into account interaction between economic agents (households, businesses and governments) as well as feedback effects between markets.
- Prices and quantities adjust to balance all markets simultaneously, in particular the labour and goods and services markets. Households and businesses adjust to changes in the economy.

A model that illustrates changes in the behavior of economic agents

The MEGFQ-E quantifies the effects of the CAT system and the 2030 Plan for a Green Economy on the various sectors of the Québec economy and on the reduction of GHG emissions.

These effects are due in particular to changes in the behaviour of households and businesses.

- Four regions are included in the model: Québec, the rest of Canada, California and the rest of the world.
- Six typical households are represented based on their income as well as their composition and about 70 categories of goods and services are modeled.
 - Purchases by economic agents depend, among other things, on their preferences and the relative prices of goods and services in the economy.
- Nearly 45 industries are represented, including large industrial businesses.
 - The production structure is detailed for each business according to the use of inputs in the production process and its consumption of hydrocarbons.
 - Taking into account their production technology, businesses choose a combination of inputs based on their relative prices to produce goods and services to maximize their profits.

Illustration of the production process of a typical business in the MEGFQ-E



Note: The main assumptions and risks for the impact analyses are presented in Appendix 1.

□ Sectoral economic impacts

It is estimated that the new free allocation rules will have a negative impact of \$57 million on Québec's real GDP in 2030. However, the effect will differ between the various sectors of the economy.

The industrial sectors most affected would be:

- the petroleum and coal product manufacturing sector (-0.3% of the sector's GDP), which includes refineries;
- the primary and fabricated metal products manufacturing sector (-0.2%), which includes, in particular, the aluminum sector;
- the non-metallic mineral product manufacturing sector (-0.2%), mainly represented by cement plants;
- the paper manufacturing and printing sector (-0.1%), which mainly includes the pulp and paper sector.

TABLE 12

Impact on real GDP by industry of the new free allocation rules – 2030 (percentage of the sector's real GDP)

	2024-2030 free allocation rules
Petroleum and coal product manufacturing	-0.3
Primary and fabricated metal products manufacturing	-0.2
Non-metallic mineral product manufacturing	-0.2
Paper manufacturing and printing	-0.1
Utilities (including natural gas distribution)	—
Mining	_
Chemical manufacturing	—
Other sectors	_
ALL ECONOMY	—

Note: The impact analyses take into account the effects of the CAT system and the reinvestment of revenues from the CAT system in the implementation plan of the 2030 Plan for a Green Economy. They do not take into account the implementation of additional actions to fight climate change in Québec and in the rest of the world. These estimates are based on information available in January 2022 and on the GHG emission projections made in the 2020-2021 budget.

□ Changes in the external environment could limit the impact of the new rules on the economy

The estimates presented assume that no additional climate change initiatives are taken by other governments.

In reality, additional actions could be taken outside Québec that could limit or even offset the negative effects of the new rules on Québec's production and exports.

For example, the industrial sector's carbon pricing protection in the rest of Canada could be reduced more significantly by 2030.

- The federal government has committed to reviewing the *Output-Based Pricing System Regulations* and has released a consultation paper on the subject in December 2021.³²
- One of the proposals being considered in the paper is an annual decrease in the performance standards of the federal carbon pricing system, which would be a decrease in protection for the industrial sector.
- If applied to all provinces and territories other than Québec, the implementation of this federal proposal, on terms similar to those outlined in its consultation paper, could result in an increase in Québec's real GDP of approximately \$125 million over the estimates presented.

TABLE 13

Illustration of the effect on Québec's real GDP of possible changes in the external environment – 2030

(millions of dollars, in real terms)

	Change in real GDP
Impact of the new 2024-2030 free allocation rules	-57
Possible reduction in the level of protection of the industrial sector in the rest of Canada	125
TOTAL	68

Note: Totals may not add due to rounding. This estimate is based on the assumption of an annual decline in the Output-Based Pricing System performance standards of 1% for sectors at high risk of carbon leakage (aluminum, cement, iron and steel) and 2% for other sectors. These estimates are based on information available in January 2022 and on the GHG emission projections made in the 2020-2021 budget.

³² ENVIRONMENT AND CLIMATE CHANGE CANADA, *Review of the OBPS Regulations: Consultation Paper*, [Online], 2021, [https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-itwill-work/output-based-pricing-system/2022-review-consultation.html].

□ A reduction of 0.7 million tonnes of GHG emissions in Québec

Based on the simulations, it is estimated that the new free allocation rules will result in a reduction in Québec GHG emissions in 2030 of 0.7 million tonnes of CO_2 equivalent (that is, 0.8% of total emissions in Québec in 2019) compared with a situation where free allocation per unit produced is maintained at the level prescribed for 2023.

These reductions are due to:

- the decrease in the level of free allocation (-0.4 million tonnes of CO₂ equivalent), mainly due to the price signal associated with the decrease in free allocation;
- the projects funded by amounts generated by consigned units or by amounts deposited into the ECCF, which will be used to finance measures under the 2030 Plan for a Green Economy across the economy (-0.3 million tonnes of CO₂ equivalent).

These reductions are in addition to those associated with the incentive effect of the CAT system, as well as those resulting from other government actions (programs, regulations, etc.).

TABLE 14

Impact of the new free allocation rules on GHG emissions

(million tonnes of CO₂ equivalent)

	2024-2030 free allocation rules
Decrease in the level of free allocation	-0.4
Consignment and reinvestment of amounts	-0.3
TOTAL	-0.7

Note: The impact analyses take into account the effects of the CAT system and the reinvestment of revenues from the CAT system in the implementation plan of the 2030 Plan for a Green Economy. The estimates are made all other things being equal, without considering the implementation of additional actions to fight climate change in Québec and in the rest of the world. These estimates are based on information available in January 2022 and on the GHG emission projections made in the 2020-2021 budget.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

Nearly 85% of estimated reductions would be in combustion emissions

Nearly 85% of the estimated reductions are in combustion emissions.

These emissions occur when fuels are burned, for example, to produce heat or electricity.

- The use of natural gas as an energy source, for example, produces combustion emissions.
- Combustion emissions can generally be reduced by replacing fossil fuel sources with renewable energy such as hydroelectricity or bioenergy.

Fixed process emissions are the result of chemical reactions to the production of certain materials.

- For example, aluminum is produced by electrolysis, using carbon anodes. The chemical reaction generated by the oxidation of the anode releases CO₂.
- By their nature, these GHG emissions are more difficult to reduce, as technologies to limit fixed process emissions do not always exist or are very expensive.

APPENDIX 1: MAIN ASSUMPTIONS AND RISKS FOR IMPACT ANALYSES

The analyses of the impacts on the economy and on the reduction of GHG emissions were carried out using the general equilibrium model of the Ministère des Finances du Québec for the environment (MEGFQ-E).

The estimates are based on several assumptions. Some of them are associated with risks that could influence the results of the simulations.

□ A different evolution of economic growth

The simulations are based on the Québec government's economic and financial projections for the various sectors of the economy available as of January 31, 2022.

However, a different evolution of economic growth or financial variables over the next few years could have an upward or downward influence on the economic impacts as well as on Québec's GHG emissions.

In particular, it should be noted that the extent of the effects of the COVID-19 pandemic on household and business behaviour currently remains a significant source of uncertainty, which could greatly influence the results of the analyses.

□ A different evolution of the price of GHG emission allowances

In the simulations, a GHG emission allowances price scenario was used, which is consistent with the projections made by the private sector.

However, the evolution of prices will depend on technological innovations, the eventual addition of new partners to the carbon market and the measures taken by the various participating governments.

- Indeed, the pace at which new GHG emission reduction technologies are developed and adopted will greatly influence the cost of achieving the GHG emission reduction targets.
- Also, the addition of new partners to the carbon market could influence prices, depending on how easily they are able to reduce their GHG emissions to meet their climate targets.

As such, a higher (or lower) price would amplify (or mitigate) the impacts of all climate change measures on the Québec economy.

□ Technological advances

The GHG emission projections and economic impacts presented are also based on assumptions about the technical improvement of industrial businesses by 2030.

The adoption of lower-emitting technologies is modeled to occur when it becomes economically advantageous given the decreasing cost of technologies, increasing carbon pricing, and government financial support.

However, new technologies may emerge that could result in, for example, greater emissions reduction by 2030.

 Conversely, delays in the development of certain technologies could result in lower-than-expected emissions reduction.

D Public and business support for the fight against climate change

The models used are based on assumptions about the structure of the economy and the behaviour of households and businesses.

The fight against climate change requires the contribution of all sectors of the economy.

A more or less significant change in the behavior of households and businesses could influence the level of emissions.

Moreover, the sensitivity of households and businesses to the various measures that will be put in place could also result in additional GHG reductions of varying degrees.

□ The external environment

Changes in the external environment can have a significant impact on GHG emissions in Québec.

For example, the implementation of climate change policies in several regions could lead to an increase in global demand for more carbon-efficient products, or increase the price of these products on international markets.

This would allow Québec industrial businesses to transfer a larger portion of the cost of carbon to their buyers, thereby reducing their financial impacts.

□ Use of additional revenues from the 2024-2030 free allocation rules

The 2024-2030 free allocation rules provide that:

- monies from the auction of consigned emission units will be set aside for a period of five years on behalf of each business to fund their climate transition investments;
- the rest of the money associated with the decrease in the free allocation will go into the ECCF, which includes funding for initiatives in various sectors of the economy.

The estimates presented in this document are based on the assumption that the majority of the additional revenues resulting from the 2024-2030 free allocation rules will be used for GHG emission reduction projects by 2030.

Use of the additional revenues that differs from the assumptions used in the modeling could result in a more or less pronounced impact on GHG emissions reduction as well as on GDP.

APPENDIX 2: REMINDER OF THE FREE ALLOCATION RULES APPLIED FOR THE PERIOD 2013 TO 2023

Until 2023, an establishment's free allocation for a year *i* will be calculated as follows:

Free allocation $_i$ = Production $_i$ × Target intensity $_i$ × Assistance factor(in t CO2 eq.)(real quantity of produced units)(in t CO2 eq. per unit produced)(in %)

The emissions target per unit produced (target intensity) decreases over time, to ensure a gradual decrease in the free allocation per unit produced.

Since the total free allocation granted to establishments is proportional to their production,³³ establishments are not affected when they increase or decrease their production.

The assistance factor, in effect from 2021 to 2023, allows for the risk of carbon leakage from different sectors. It is based on the level of exposure to international competition and the intensity of emissions as a proportion of the economic value of production (GDP).

Establishments are thus classified into four levels of risk, with an associated assistance factor value: 100% (high risk), 95% (medium risk), 90% (low risk) and 60% (very low risk).

GHG emission targets by unit of production

The target intensity generally differs for each product and therefore varies from one business to another, with the exception of the aluminum, cement and lime sectors, where the target intensity for a particular product is determined on a sectoral basis.

The starting point for the target intensity is the average actual GHG emissions intensity per unit produced for the baseline period (usually the average actual emissions intensity for the years 2007-2010).

Thereafter, an annual reduction is applied to the baseline intensity, depending on the type of GHG emissions associated with the manufacture of the product in question (combustion emissions, stationary process emissions, or "other", primarily fugitive, emissions).

- From 2013 to 2020, a reduction effort was required only for combustion and "other" emissions. This effort ranged from 1% to 3%, depending on the business's situation and the performance observed for the 2007-2010 reference period.³⁴
 - No reduction in the free allocation was planned for fixed process emissions.
- From 2021 to 2023, the annual rate of decrease in target intensity for fixed process emissions is 0.5%, while it is higher for combustion emissions (1.5%) and other emissions (3%).

³³ Production is measured by the total quantity of benchmark units produced. The benchmark unit varies from sector to sector and, in most cases, from establishment to establishment within the same sector. For example, for an establishment in the metallurgy sector, the benchmark unit might be a metric ton of forged steel, while for an agri-food establishment it might be a kiloliter of milk.

³⁴ This effort does not take into account transitional adjustments resulting from the implementation of the CAT system.

□ The 2023 target intensity: the starting point for the new free allocation rules

From 2013 to 2023, most of the effort required from businesses comes from a reduction in the target intensity.

The last year in which this mechanism is used is 2023. The target intensity for 2023 is thus the starting point for the rules that will apply from 2024 to 2030.

Beginning in 2024, an establishment's target intensity for a given year will be determined by both its calculated target intensity for the previous year and the average actual intensity for the years 2017 through 2019.

APPENDIX 3: DETAILED PRESENTATION OF THE 2024-2030 FREE ALLOCATION RULES

Beginning in 2024, a business's free allocation for a year *i* will be determined as follows:



(in %)

The new method for calculating the free allocation will have several differences from the one applied between 2013 and 2023.

- The target intensity will gradually incorporate more recent establishment performance on emissions per unit produced, which is the actual average emissions intensity for the years 2017 through 2019.
- The assistance factor will be set at the level applicable in 2023 for each business receiving free allocation and will not change again between 2024 and 2030.
- The cap decline factor will apply to all establishments receiving free allocation and will decline by 2.34 percentage points (pp) per year.
 - This 2.34 pp is the annual cap decline in the CAT system from 2024 to 2030.
 - It thus establishes the basis for a free allocation trajectory consistent with Québec's 2030 emissions reduction target.
- In addition to the cap decline factor, which is consistent across establishments, there will be an
 expected additional effort that will vary across sectors to reflect differences in competitiveness
 risks.
- Finally, a trajectory adjustment factor will also be added to mitigate the effort required of establishments in the near term while ensuring consistency with the 2030 target.

⁻ As with the cap decline factor, this parameter will change in the same way for each business.

□ Revising the method for calculating the emissions intensity target to better reflect the reality of businesses

Starting in 2024, more recent performance of establishments per unit produced (actual intensities) will be gradually taken into account in the calculation of the target intensity.

Specifically, the target intensity applicable to an establishment in a given year will be equal to 90% of the target intensity in effect the previous year and 10% of the establishment's average actual intensity for the years 2017 through 2019.

The 2023 target intensity, which marks the end of the 2013-2023 rules, will be the new starting point for the 2024-2030 approach.³⁵

Therefore, for the year 2024, the target intensity will be determined as follows:

Target intensity₂₀₂₄ = $(90\% \times \text{Target intensity}_{2023}) + (10\% \times \text{Actual intensity}_{2017-2019})$

Over time, the influence of the 2023 target intensity in the calculation of a given year's target intensity will diminish, in favor of the observed performance from 2017 to 2019.

 For illustrative purposes, the 2030 target intensity will be determined 48% by the 2023 target intensity and 52% by the average actual 2017-2019 intensity.

As with the current rules, intensity targets will be determined on a per unit basis for each establishment, except in the aluminum and lime and cement sectors, where targets will continue to be set on a sectoral basis.

While under the current rules, the rate of decline in the intensity target varies by emission type, the method for calculating the intensity target will now be the same for all emission types.

ILLUSTRATION 5

Methodology for phasing in average actual emission intensity from 2017 to 2019



³⁵ For establishments that will be subject to the CAT system starting in a year after 2023, the starting intensity will be used.

A method that safeguards the incentive to reduce GHG emissions

This new calculation method will make it possible to reduce the free allocation in an equitable manner, while ensuring that its evolution remains consistent with Québec's long-term climate objectives.³⁶

The new method of calculating target intensity strikes a balance between adapting to the new realities of businesses, recognizing the emission reduction efforts made since the creation of the CAT system and preserving the incentive to carry out emission reduction projects.

- Incorporating the average actual 2017-2019 intensity into the target intensity will better reflect the reality of businesses, which may have evolved since the implementation of the CAT system. In addition, it will have an effect on the benefits of projects carried out in the past, which will be marginal, however, since the inclusion of the actual 2017-2019 intensity in the target intensity will be gradual and will only begin in 2024.
- Emission reduction projects carried out after 2019 will not affect the target intensity: the incentive for businesses to carry out projects to reduce their emissions will therefore be complete.

ILLUSTRATION 6

Effect of the new emissions intensity target calculation method on the value of allowances to be purchased and excess allowances



³⁶ A mechanism is also provided to ensure that the free allocation per unit produced of an establishment does not exceed its free allocation per unit produced granted in 2023.

Considering sectoral differences in the reduction of the free allocation

The expected additional effort will be determined by several criteria.

- First, activity sectors with low exposure to international trade³⁷ will have an expected additional effort of 1.36%.
- Secondly, businesses and sectors that are more exposed to international trade will be differentiated according to the importance of GHG emissions in their value creation process (economic intensity of emissions),³⁸ and classified according to seven relative levels of risk to competitiveness.
- Finally, a reduction in the expected additional effort of 0.27 pp³⁹ will be granted when fixed process emissions are equal to or greater than 50% of total emissions, to take into account the significant costs associated with reducing this type of emissions.
 - As such, a business classified at risk level 7 with 50% or more fixed process emissions would have an expected additional effort of -0.54 pp.

The expected additional effort therefore varies from -0.54 pp to 1.36 pp per year, depending on the different industrial realities.

TABLE 15

Expected additional effort by economic emissions intensity and proportion of fixed process emissions

(percentage point per year, unless otherwise indicated)

		Expected additional effort			
Risk level	Economic emissions intensity (kt CO₂ eq./\$M GDP)	Fixed process emissions less than 50%	Fixed process emissions equal to or greater than 50%		
1	0-1	1.36	1.09		
2	1-2	1.09	0.82		
3	2-3	0.82	0.54		
4	3-4	0.54	0.27		
5	4-5	0.27	0.00		
6	5-6	0.00	-0.27		
7	6+	-0.27	-0.54		

Note: For industries with high exposure to international trade (exposure ratio to international trade greater than 20%).

³⁷ Ratio of exposure to international trade below 20%.

³⁸ Emissions intensity as a proportion of the establishment's GDP or value added.

³⁹ Equivalent to an increase in risk level.

Methodology for ranking businesses according to the relative risk to competitiveness

The expected additional effort required from businesses varies according to the relative risk of harm to their competitiveness. The ranking of businesses according to this risk is done in two steps.

Step 1: Determining the trade exposure ratio

The trade exposure ratio is obtained by calculating the following ratio:

Exports + Imports

Domestic production + Imports

This is a measure of the relative ability of businesses to reflect the carbon cost induced by the CAT system in the price of their products. The higher the ratio, the more businesses are theoretically dependent on prices set in international markets.

Businesses with a trade exposure ratio of less than 20% are assigned an expected additional effort of 1.36% per year, or 1.09% if fixed process emissions account for 50% or more of their total emissions.

For businesses whose trade exposure ratio will exceed the 20% threshold, Step 2 allows for further modulation of the expected additional effort.

Step 2: Distributing businesses according to the economic intensity of their emissions

The second step consists of classifying businesses whose trade exposure ratio exceeds 20% among seven risk levels according to the economic intensity of their emissions (emissions as a proportion of the establishment's GDP or value added), which is estimated using the following formula:

GHG emissions GDP

A business with an economic emissions intensity of less than 1 kt CO₂ eq. per million dollars of GDP would be classified as Risk Level 1, which is equivalent to an expected additional effort of 1.36 pp/year.

 The assigned risk level increases for each 1 kt CO₂ eq. per million dollars of GDP, up to a maximum level of 7. For each additional risk level, approximately 0.27 pp would be subtracted from the effort required, down to a minimum of −0.27 pp (reduction in the effort required).

Illustration of the ranking according to the economic emissions intensity



Gradually accelerating the reduction in the free allocation granted

Currently, Québec is ahead of the rest of the world in terms of carbon pricing, which can put its industrial businesses at a competitive disadvantage.

 In order to take into account this lead, the free allocation granted will decrease less sharply at the beginning of the 2024-2030 period, as a result of the trajectory adjustment factor.

This factor will then accelerate the decline in the free allocation granted, so that the volume of free allocation in 2030 will remain consistent with Québec's climate objectives.

Therefore, the cumulative effect of the trajectory adjustment factor on the free allocation granted for the entire 2024-2030 period will be nil.

In fact, from 2024 to 2026, the trajectory adjustment factor will slow the decline in the free allocation granted. Then, in 2027, it will have no effect on the decline. Finally, from 2028 to 2030, it will accelerate the decline in the free allocation granted.

TABLE 16

Changes in the trajectory adjustment factor

(percentage point per year)

Year	Trajectory adjustment factor	Cumulated effect
2024	-0.50	-0.50
2025	-0.50	-1.00
2026	-0.25	-1.25
2027	0.00	-1.25
2028	0.25	-1.00
2029	0.50	-0.50
2030	0.50	0.00

A mechanism to determine the amount of consigned emission units

Beginning in 2024, the rules provide for a total volume of free allocation to industrial businesses based on two components:

- free allocation granted,⁴⁰ which may be used by businesses to ensure their current or future compliance;
- the consigned free allocation, the value of which will be reserved on behalf of businesses to finance their projects related to the climate transition.

The new rules provide for a decrease from 1.30 pp to 4.20 pp per year in the free allocation granted to businesses per unit produced (without taking into account the integration of the average actual intensity). This decrease will be divided into:

- a minimal expected effort (MEE) of 1 pp per year for all establishments;
 - The units reduced by the effect of the MEE will be auctioned. The proceeds will go to the Electrification and Climate Change Fund, for funding of the implementation plan of the 2030 Plan for a Green Economy.
- A free allocation consigned on behalf of businesses, which will be composed of the emission units corresponding to the free allocation reduction granted in excess of 1 pp per year.

Calculation of consigned amounts

As explained above, the total amount of free allocation granted to a business for year *i* is calculated based on the minimal expected effort, with the following formula:

Total free allocation_{*i*} = Production_{*i*} × Target intensity_{*i*} × ($AF_{2023} - MEE_i$)

Since the assistance factor (AF_{2023}) is set at the 2023 level, the total free allocation therefore decreases by 1 pp per year.

Consignment is the difference between the total free allocation determined for the business and the free allocation that will be granted to it.

 $Consignment_i = Total free allocation_i - Free allocation granted_i$

⁴⁰ This would be the same type of free allocation that will have been paid between 2013 and 2023.

APPENDIX 4: ILLUSTRATION OF THE EFFECT OF THE PROPOSED FREE ALLOCATION RULES FOR FICTITIOUS BUSINESSES

The proposed free allocation rules for the period 2024-2030 will have different impacts among large industrial businesses, depending in part on their assigned level of carbon leakage risk, their GHG emissions performance, and the effect of the rules in place until 2023.

In general, industrial sector establishments will be in one of two situations in 2023:

- they will have to purchase emission allowances, while their emissions will be greater than the emission units they receive free of charge;
- they will receive more emission units than they emit, while their GHG emissions will have been reduced more quickly than the free allocation between 2013 and 2023.

□ Test case A – Business required to purchase emission allowances

This example illustrates the situation of a fictitious business that has to purchase emission allowances, and whose entire emissions result from the use of fossil fuels as a heat source in production.

- For this business, the current regulations foresee an average annual decrease in the free allocation per unit produced of 2.1% between 2013 and 2023.
- The regulatory approach for the period 2024-2030 calls for an average annual reduction of 3.5% in the free allocation granted.

CHART 16

Evolution of the free allocation granted per unit produced for a fictitious business – Test case A

(percentage of 2007-2010 baseline emission intensity)



Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

Establishment's status and impact of the phased-in inclusion of average actual performance for the period 2017-2019

The 3.5% average annual reduction in the free allocation granted from 2024 to 2030 to this business is the result of a combination of the parameters in the approach, but also the phased-in inclusion of the average actual GHG emissions intensity for the period 2017-2019 in the calculation.

For the purposes of the illustration, we assume that the fictitious establishment emitted 100 kt of CO₂ eq. on average for the period 2007-2010, for an annual production of 1 000 units.⁴¹

— The starting intensity of the business would therefore be 100 t of CO₂ eq. per unit produced.

Since 2007-2010, this establishment would have reduced its emissions so that it would emit 88 000 t of CO_2 eq. annually for the period 2017-2019. Its average actual emissions intensity would thus be 88 t of CO_2 eq. per unit produced for the period 2017-2019.

With the current regulations, its target intensity would be 81 t CO_2 eq. per unit produced in 2023 and it would thus receive 81 000 emission units free of charge.

 If the performance of this establishment did not change between 2017-2019 and 2023, the free allocation would thus cover 92% of the business's GHG emissions in 2023, resulting in the purchase of 7 000 allowances for compliance purposes.

Starting in 2024, the integration of the business's actual 2017-2019 performance, at a rate of 10% per year, would gradually reduce the gap between its target intensity and its actual 2017-2019 intensity.

 The target intensity would gradually increase to 85 t CO₂ eq. per unit produced in 2030, an average annual increase of 0.6% per year.

CHART 17

CHART 18

Coverage of GHG emissions by free allocation in 2023 – Test case A

(thousands of tonnes of CO2 equivalent)



2017-2019 intensity – Test case A (in tonnes of CO₂ equivalent per unit produced)

Evolution of the target intensity according

to the inclusion of the average actual



Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec. Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

⁴¹ The production of this establishment is assumed to be constant over the entire period.

Combined effect of the 2024-2030 free allocation rules

For the purposes of the illustration, we assume that this establishment is highly exposed to trade, but that its economic emissions intensity is less than 1 kt CO_2 eq. per million dollars of GDP (kt/\$), while the average in the industrial sector is about 3 kt/\$.

- The business would therefore have an expected additional effort of 1.36 pp.
- Furthermore, since all of its GHG emissions are from combustion, the expected additional effort would not be reduced by 0.27 pp.
- At the same time, we assume that the business's assistance factor for 2023 was 1.00 pp.

Furthermore, the calculation of the free allocation granted to the business takes into account the actual 2017-2019 intensity of the establishment, which increases the target intensity by 4 pp over the period, to 85 t CO_2 eq. per unit produced in 2030.

Overall, for a fixed production of 1 000 units, the free allocation in 2024 and 2030 for the establishment would be calculated as follows:⁴²

Free allocation granted_i = Production_i × Target intensity_i × $[AF_{2023} - CDF_i - EAE_i - TAF_i]$

Free allocation granted₂₀₂₄ = $1\ 000 \times 82 \times [1.0 - 2.34\% - 1.36\% + 0.5\%] = 79\ 376$

Free allocation granted₂₀₃₀ = $1\,000 \times 85 \times [1.0 - 16.38\% - 9.52\% - 0\%] = 62\,985$

This is an average annual decrease of 3.5% in the free allocation granted from 2024 to 2030.

— In percentage points, this would reflect an average annual decrease of 3.18 pp.

TABLE 17

Combined effect of parameters and incorporation of average actual 2017-2019 intensity on the reduction in free allocation granted – Test case A (percentage points per year, unless otherwise indicated)

	Parameters for the calculation of the free allocation
Cap decline factor	2.34
Expected additional effort	1.36
Trajectory adjustment factor (2024-2030 average)	_
Subtotal	3.70
Impact of the phased-in inclusion of the average actual 2017-2019 intensity	-0.52
TOTAL EFFECT	3.18
Per cent	3.53

⁴² The cumulative effect of the trajectory adjustment factor (TAF) on the free allocation granted is +0.5% in 2024 and 0% in 2030.

Consignment of emission units to promote climate transition

The consignment mechanism will allow the business to accumulate funds to finance its GHG emission reduction projects.

 Between 2024 and 2030, the cumulative value of allowances consigned for this business would be \$4.7 million, including \$1.6 million in 2030.

In 2024, this business's total allocation would be 81 180 units and would decrease to 79 050 units in 2030, based on the following calculation:

Total free allocation_{*i*} = Production_{*i*} × Target intensity_{*i*} ×
$$[AF_i - MEE_i]$$

Total free allocation₂₀₂₄ = $1\,000 \times 82 \times [1.0 - 1\%] = 81\,180$

Total free allocation₂₀₃₀ = $1\,000 \times 85 \times [1.0 - 7\%] = 79\,050$

The average annual reduction of 1 pp per year in the total free allocation is mitigated by the phased-in inclusion of the average actual 2017-2019 intensity, which gradually raises the establishment's target intensity.

Since consigned units reflect the difference between total allocation and free allocation granted, this will result in consigned free allocation volumes reaching 1 804 units in 2024 and 16 065 units in 2030.

Consigned free allocation_{*i*} = Total free allocation_{*i*} - Free allocation granted_{*i*}

Consigned free allocation₂₀₂₄ = $81 \, 180 - 79 \, 376 = 1 \, 804$

Consigned free allocation₂₀₃₀ = $79\,050 - 62\,985 = 16\,065$

TABLE 18

Summary of the proposed rules for the establishment – Test case A

(in tonnes of CO_2 equivalent, unless otherwise indicated)

	Calculation	2024	2025	2026	2027	2028	2029	2030	Total 2024-2030
GHG emissions	А	88 000	88 000	88 000	88 000	88 000	88 000	88 000	616 000
Free allocation granted	В	79 376	76 752	74 825	71 754	69 300	65 772	62 985	500 763
Difference – Emission allowances to purchase	C = A - B	8 624	11 248	13 176	16 247	18 700	22 228	25 015	115 237
Coverage rate	B/A	90%	87%	85%	82%	79%	75%	72%	81%
Total allocation	D	81 180	80 360	80 510	79 680	79 800	78 960	79 050	559 540
Consigned allocation	E = D - B	1 804	3 608	5 686	7 927	10 500	13 188	16 065	58 777
Value of purchase of emission allowances (\$M)	C x price	0.4	0.6	0.8	1.1	1.4	1.9	2.4	8.7
Value of consigned units (\$M)	E x price	0.1	0.2	0.3	0.5	0.8	1.1	1.6	4.7

Note: It is assumed that this establishment's production is constant over the entire period and that there is no change in its GHG emissions performance since 2017-2019.

Test case B – Business that reduced its emissions and has a surplus of units received free of charge

Some establishments have been able to reduce their GHG emissions, due to improvements in their GHG performance since 2007-2010, and thus generate a surplus of free allocation.

 Establishments that have reduced their emissions over time beyond the rate of reduction of the free allocation are consequently receiving more free units than they are emitting.

For the purposes of the illustration, we use the case of a fictitious business whose improved performance since 2013 has allowed it to receive more free allocation than it needs to cover its GHG emissions.

Moreover, it is assumed that the majority of this business's GHG emissions are fixed process emissions.

The current regulatory approach projects an average annual decrease in free allocation per unit produced of 0.9% between 2013 and 2023 for this business.⁴³

- However, over the period 2024-2030, the average annual reduction would be 2.5% per year.

CHART 19

Evolution of the free allocation granted per unit produced for a fictitious business – Test case B

(percentage of 2007-2010 baseline emission intensity)



⁴³ The rate of reduction of the free allocation over the period 2013-2023 was lower for fixed process emissions.

Establishment's status and impact of the phased-in inclusion of average actual performance for the period 2017-2019

The 2.5% average annual reduction in the free allocation granted to the business is the result of a combination of the parameters in the approach, but also the phased-in inclusion of the average actual GHG emissions intensity for the period 2017-2019 in the calculation.

For the purposes of the illustration, we assume that the fictitious establishment emitted 100 kt of CO₂ eq. on average for the period 2007-2010, for an annual production of 1 000 units.⁴⁴

— The starting intensity of the business would therefore be 100 t of CO_2 eq. per unit produced.

Since 2007-2010, it is assumed that this establishment would have reduced its emissions so that it would emit 88 000 t of CO₂ eq. on average annually for the period 2017-2019. Its actual average emissions intensity would thus be 88 t of CO₂ eq. per unit produced for the period 2017-2019.

With the current regulation, its target intensity would be 91 t CO₂ eq. per unit produced in 2023 and it would thus receive 91 000 emission units free of charge.

- If the performance of this establishment did not change between 2017-2019 and 2023, the free allocation would thus cover 103% of the business's GHG emissions in 2023, resulting in a surplus of 3 000 allowances.

Starting in 2024, the integration of the business's actual 2017-2019 performance, at a rate of 10% per year, would gradually reduce the gap between its target intensity and its actual 2017-2019 intensity.

— The target intensity would gradually decrease to $89 \text{ t } \text{CO}_2$ eq. per unit produced in 2030, an average annual decrease of 0.2% per year.

CHART 20

CHART 21

Coverage of GHG emissions by free Evolution of the target intensity according allocation in 2023 - Test case B

(thousands of tonnes of CO₂ equivalent)



to the inclusion of the average actual 2017-2019 intensity - Test case B (tonnes of CO₂ equivalent per unit produced)



Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

44 The production of this establishment is assumed to be constant over the entire period.

Combined effect of the 2024-2030 free allocation rules

For the purposes of the illustration, we assume that this establishment is highly exposed to trade, and that its economic emissions intensity is more than 5 kt CO_2 eq. per million dollars of GDP (kt/\$), while the average in the industrial sector is about 3 kt/\$.

- The business would therefore have an expected additional effort of zero (0.00 pp), but since the majority of its GHG emissions are fixed process emissions, the additional effort is reduced by 0.27 pp.
 - The expected additional effort is therefore of -0.27 pp.

— At the same time, we assume that the business's assistance factor for 2023 was 1.00 pp.

Furthermore, the calculation of the free allocation granted takes into account the average actual 2017-2019 intensity of the establishment, which decreases the target intensity by 2 pp over the period, to 89 t CO_2 eq. per unit produced in 2030.

Overall, for a fixed production of 1 000 units, the free allocation in 2024 and 2030 for the establishment would be calculated as follows:⁴⁵

Free allocation granted_i = Production_i × Target intensity_i × $[AF_{2023} - CDF_i - EAE_i - TAF_i]$

Free allocation granted₂₀₂₄ = $1\ 000 \times 91 \times [1.0 - 2.34\% + 0.27\% + 0.5\%] = 89\ 571$

Free allocation granted₂₀₃₀ = $1\,000 \times 89 \times [1.0 - 16.38\% + 1.89\% - 0\%] = 76\,104$

This is an average annual decrease of 2.5% in the free allocation granted from 2024 to 2030.

— In percentage points, this reflects an average annual decrease of 2.34 pp.

TABLE 19

Combined effect of parameters and incorporation of average actual 2017-2019 intensity on the reduction in free allocation granted – Test case B (percentage points per year, unless otherwise indicated)

	Parameters for the calculation of the free allocation
Cap decline factor	2.34
Expected additional effort	-0.27
Trajectory adjustment factor (2024-2030 average)	_
Subtotal	2.07
Impact of the phased-in inclusion of the average actual 2017-2019 intensity	0.27
TOTAL EFFECT	2.34
Per cent	2.52

⁴⁵ The cumulative effect of the trajectory adjustment factor (TAF) on the free allocation granted is +0.5% in 2024 and 0% in 2030.
Consignment of emission units to promote climate transition

The consignment mechanism will allow the business to accumulate funds to finance its GHG emission reduction projects.

 Between 2024 and 2030, the cumulative value of allowances consigned for this business would be \$1.8 million, including \$0.6 million in 2030.

In 2024, this business's total allocation would be 90 090 units and would decrease to 82 770 units in 2030, based on the following calculation:

Total free allocation_{*i*} = Production_{*i*} × Target intensity_{*i*} ×
$$[AF_i - MEE_i]$$

Total free allocation₂₀₂₄ = $1\,000 \times 91 \times [1.0 - 1\%] = 90\,090$

Total free allocation₂₀₃₀ = $1\ 000 \times 89 \times [1.0 - 7\%] = 82\ 770$

The average annual reduction of 1 pp per year in the total free allocation is mitigated by the phased-in inclusion of the average actual 2017-2019 intensity, which gradually raises the establishment's target intensity.

Since consigned units reflect the difference between total allocation and free allocation granted, the volumes of free allocation consigned will therefore reach 519 units in 2024 and 6 666 units in 2030.

Consigned free allocation_{*i*} = Total free allocation_{*i*} - Free allocation granted_{*i*}

Consigned free allocation₂₀₂₄ = $90\ 090 - 89\ 571 = 519$

Consigned free allocation₂₀₃₀ = 82770 - 76104 = 6666

TABLE 20

Summary of the proposed rules for the establishment – Test case B (tonnes of CO₂ equivalent, unless otherwise indicated)

	Colouistion	2024	2025	2026	2027	2020	2020	2020	Total
	Calculation	2024	2025	2020	2027	2020	2029	2030	2024-2030
GHG emissions	А	88 000	88 000	88 000	88 000	88 000	88 000	88 000	616 000
Free allocation granted	В	89 571	87 174	85 536	83 673	81 585	79 272	76 104	582 915
Difference – Emission allowances to purchase	C = A - B	-1 571	826	2 464	4 327	6 415	8 728	11 896	33 085
Coverage rate	B/A	102%	99%	97%	95%	93%	90%	86%	95%
Total allocation	D	90 090	88 200	87 300	86 400	85 500	84 600	82 770	604 860
Consigned allocation	E = D – B	519	1 026	1 764	2 727	3 915	5 328	6 666	21 945
Value of the purchase of emission allowances (\$M)	C x price	-0.1	0.0	0.1	0.3	0.5	0.8	1.1	2.8
Value of consigned units (\$M)	E x price	0.0	0.1	0.1	0.2	0.3	0.5	0.6	1.8

Note: It is assumed that this establishment's production is constant over the entire period and that there is no change in its GHG emissions performance since 2017-2019.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

APPENDIX 5: SENSITIVITY ANALYSIS

The cumulative financial impact of the new free allocation rules over the period 2024-2030 could be \$671 million compared to a situation where the free allocation per unit produced is set at the level prescribed for 2023.

 Including the effect of the rules that will apply until 2023, the total financial impact of the free allocation rules could be as high as \$1.2 billion over the period 2024-2030.

These estimates are based on several assumptions, including no improvement in the performance of businesses in terms of GHG emissions and a change in the price of carbon to \$97 per ton of CO₂ equivalent in 2030.

Different changes in these variables could result in different impacts.

General Effect of improved business performance

Since the system was launched in 2013, businesses have reduced their GHG emissions per unit of output by an average of 0.7% per year.

If all businesses improved consistently at the historical average rate, the total cumulative financial impact over the period 2024-2030 would be reduced by \$456 million (-39% from the scenario presented in the analysis).

 This performance could be attributed in part to the use of funds from the consignment of emission units.

TABLE 21

Illustration of the impact of an improvement in business performance on the value of purchased and consigned allowances between 2024 and 2030 (millions of dollars)

	Without improvement	With historical improvement	Difference
Financial impact			
Financial impact of maintaining the rules ⁽¹⁾	500	287	213
Financial impact of the new rules	671	428	243
Total – Financial impact	1 171	715	456
Consigned free allocation	581	581	_

Note: Estimates with constant production.

(1) Based on the assumption that the free allocation rules prescribed for 2023 are maintained for the period 2024-2030.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

A different evolution of the price of carbon

The impact analyses presented are based on a carbon pricing scenario that reaches \$97 per ton of CO_2 equivalent in 2030. However, the price of carbon in the CAT system is subject to considerable variability.

As such, a different change in the price in the coming years could result in greater or lesser financial impacts for large industrial businesses compared to the estimates presented.

For example, the total cumulative financial impact for large industrial businesses would be:

- \$878 million if the carbon price were \$72 per tonne of CO₂ equivalent in 2030 (-25%);
- \$1 464 million if the carbon price were \$121 per tonne of CO₂ equivalent in 2030 (+25%).

TABLE 22

Illustration of the impact of the evolution of the carbon price on the value of purchased and consigned allowances between 2024 and 2030

(millions of dollars, unless otherwise indicated)

	Lower price scenario ⁽¹⁾	Middle scenario	Higher price scenario ⁽²⁾
Carbon price in 2030 (\$/t CO ₂ eq.)	72	97	121
Financial impact			
Financial impact of maintaining the rules ⁽³⁾	375	500	625
Financial impact of the new rules	503	671	839
Total – Financial impact	878	1 171	1 464
Consigned free allocation	436	581	726

Note: Estimates without improvement in the performance of businesses in terms of GHG emissions and with constant production.

(1) Scenario in which the price of carbon in 2030 is 25% lower than in the middle scenario.

(2) Scenario in which the price of carbon in 2030 is 25% higher than in the middle scenario

(3) Based on the assumption that the free allocation rules prescribed for 2023 are maintained for the period 2024-2030.

Sources: Ministère de l'Environnement et de la Lutte contre les changements climatiques and Ministère des Finances du Québec.

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